

**THE CITY OF FREDERICK
MAYOR AND BOARD OF ADLermen**

RESOLUTION NO: 22-03

A RESOLUTION concerning

The 2020 Comprehensive Plan

BACKGROUND

On April 15, 2021, the Board of Aldermen approved Resolution No. 21-05, thereby adopting the 2020 Comprehensive Plan (the "Plan"), with an effective date of October 1, 2021. Subsequently, in accordance with Section 305 of the Land Management Code, the Planning Division made application to amend the Plan for the following purposes: (1) in Chapter 3, "Transportation", to revise the roadway classification map to correct an administrative error with respect to Waterside Drive and to modify the alignment of Christopher's Crossing and Kemp Lane; and (2) in Chapter 4, "Municipal Growth", to add map of future Frederick County Public Schools sites.

On October 11, 2021, following the provision of public notice as required by LMC Section 305, the Planning Commission held a public hearing on the proposed amendments and at the conclusion of the hearing voted 5-0 to recommend approval, based upon findings of fact as required by LMC Section 305.

On March 17, 2022, following the provision of public notice as required by LMC Section 305, the Board of Aldermen held a public hearing on the proposed amendments.

NOW THEREFORE BE IT RESOLVED, That, with respect to the proposed 2020 Comprehensive Plan amendments attached hereto as Exhibit A and incorporated herein by this reference and in accordance with Section 305 of the Land Management Code, the Board of Aldermen of The City of Frederick hereby finds:

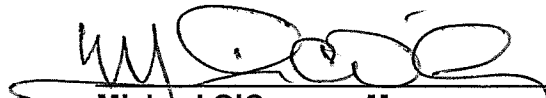
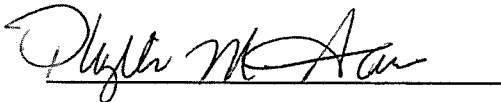
- (1) The amendments are compatible with the adopted policies of the Plan. The addition of the future school map provides predictability when considering land use and municipal growth policies that will ensure collaboration with Frederick County and will help secure adequate infrastructure to serve future population growth. The revision to the roadway classification map clarifies future roadway improvements to assist with coordinating the phasing of development with needed transportation capacity and improvements
- (2) The amendments will not impact the fiscal health of the City.
- (3) The amendments will strengthen existing policies of the Plan.
- (4) The purpose of the amendment to the Municipal Growth Chapter is to coordinate with the Frederick County Public Schools Educational Facilities Plan. The purpose of the amendment to the Transportation Chapter is amend the Roadway Classification Map to include previously approved roadway improvements
- (5) The proposed amendments will assist the City in meeting future capital infrastructure needs, improving the capacity for future population growth.

- (6) The proposed amendment to the Municipal Growth Chapter is not applicable to a specific property. The proposed amendment to the roadway classification map is specific to the "Gambrill View" property. The amendment reflects previously approved infrastructure improvements.
- (7) The proposed amendment to the Transportation Chapter provides an alternative alignment for Christopher's Crossing that will have the potential to alleviate traffic congestion and improvement the roadway network to the surrounding neighborhoods and the City.
- (8) The proposed amendment to the Transportation Chapter reflects development plans that have been approved in conformance with the Land Management Code.
- (9) The amendments will not pressure or change the land use designations of other properties. The amendments are in the best long-term, general interest of the City.
- (10) The amendments will not increase traffic, schools or population, but rather are intended to increase capacity for roads and schools for future population growth.


AND BE IT FURTHER RESOLVED BY THE BOARD OF ALDERMEN OF THE CITY OF FREDERICK, That the 2020 Comprehensive Plan amendments attached hereto as Exhibit A are hereby approved without modification.

ADOPTED AND APPROVED THIS 17th DAY OF March, 2022.

WITNESS


Michael O'Connor, Mayor

Approved for Legal Sufficiency:

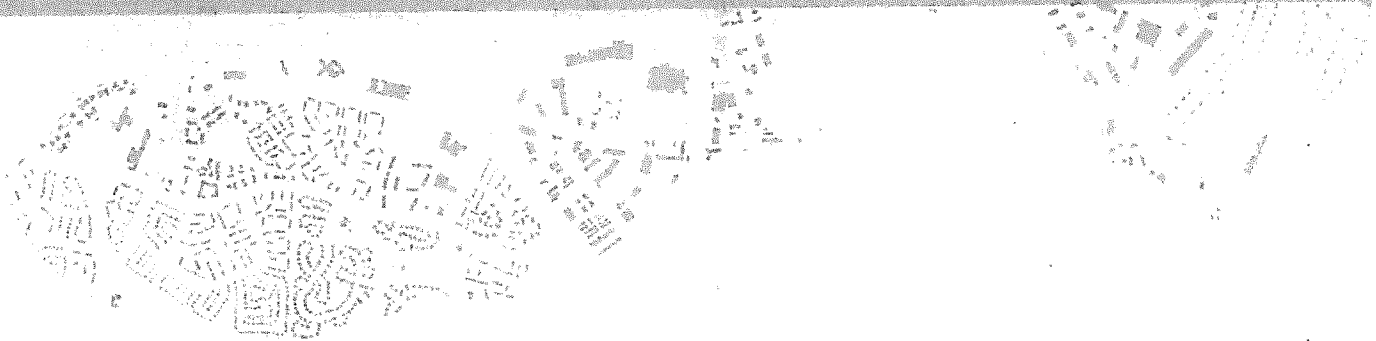

City Attorney



QUALITY OF LIFE AND SUSTAINABILITY
PUBLIC PARTICIPATION
GROWTH AREAS
COMMUNITY DESIGN
INFRASTRUCTURE
TRANSPORTATION
HOUSING
ECONOMIC DEVELOPMENT
ENVIRONMENTAL PROTECTION
RESOURCE CONSERVATION
STEWARDSHIP
IMPLEMENTATION

3

TRANSPORTATION

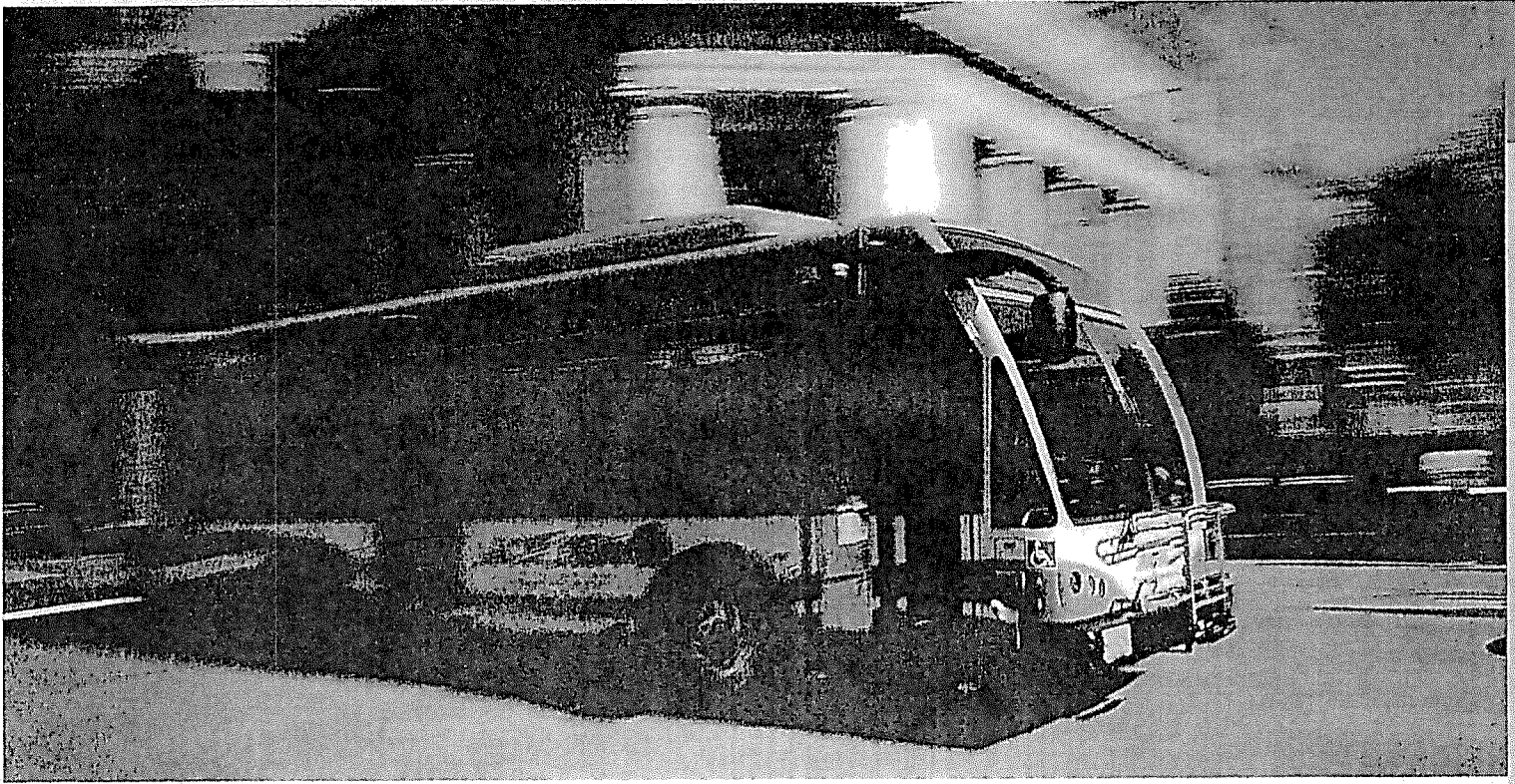


OVERVIEW

The bedrock of a city's functionality is its transportation infrastructure. How people move dictates whether a city needs a redundant system of roadways, sidewalks, bicycle facilities, transit service, or parking, and the relationship to land uses and the built environment. As a result, a well-planned transportation system is critical to a local as well as regional economic stability and growth.

THE BASIC LINK OF DENSITY AND TRAVEL

A place that has a dense mix of homes, businesses, and services works best when people move slowly through it on foot or bike, and those places can only form when there is significant investment in walking and bicycling. A place that is low-density and has little or no mixing of homes, businesses, and services works best when people move fast through it in a car, and those places can only function when there is significant investment in roads and parking.



Source: The Frederick News-Post

TRANSPORTATION AND LAND-USE: TWO SIDES OF THE SAME COIN...

THE CITY OF FREDERICK AND THIS PLAN DESCRIBE TRANSPORTATION AND LAND-USE IN SEPARATE CHAPTERS, BUT ON THE GROUND THEY ARE INSEPARABLE. EACH DECISION ABOUT WHAT SORT OF LAND-USE THE CITY SHOULD HAVE, AND EACH DOLLAR SPENT ON A GIVEN TRANSPORTATION MODE INFLUENCES HOW PEOPLE TRAVEL AND WHAT SORTS OF PLACES THRIVE AND GROW.



WHAT ABOUT TRANSIT?

Public transit moves people much faster than walking to places where they need to get around on foot. Transit, then, best serves those dense places that thrive best with foot traffic. MARC trains and MTA buses function well in bringing people from Frederick to Rockville, Silver Spring, and downtown Washington. These destinations are dense enough that travelers can easily walk to work from their transit stops, and the reason downtown Washington has remained so dense is that it is served by high-quality public transit and the foot traffic that transit brings.

This is the understanding behind what's often called *transit-oriented development*. To make sure people can easily get from their homes to the station and from there to work, a city will try to focus more dense development around the station, with destinations – like shopping and services – nearest the station.

In Frederick, as in other communities, transportation and land use issues are interconnected. Unfortunately, the City's transportation infrastructure has not been efficiently integrated into its developed areas, resulting in inefficient land uses and inefficient patterns of movement by its residents and visitors. Since the 1950s, new development in Frederick has increasingly taken the form of low- to medium-density residential neighborhoods and commercial strip centers. Rather than carry forward the character and connections of nearby neighborhoods, such as Monocacy Village and Frederick Heights, these areas have been isolated. As a result, they have not contributed to the development of an efficient citywide transportation system.

Frederick's position within the larger Baltimore-Washington metropolitan region is an asset for the community, but it does pose particular transportation challenges. Frederick sits at the confluence of two major interstates (I-270 and I-70), three major US highways (US routes 15, 40, and 340) and three major state highways (MD-180, MD-355, and MD-26). While the City has always been a crossroads, interconnections between all these major roads has placed demands on the local transportation system.

Finally, Frederick has the most bicycles per capita in the Washington metropolitan region and extremely high recreational bicycle use. Despite this, few people who both live and work within the City commute by bicycle, preferring instead to drive primarily due to lack of safe and comfortable bicycle infrastructure. This puts pressure on our roads and parking system and adds vehicular traffic on City streets.

The objective of this Transportation Chapter is to outline policies that balance multiple interests while creating a transportation system that efficiently ties the City together. The Issues and Opportunities section of this chapter outlines several guiding principles associated with sustainable, integrated transportation. These principles are:

1. Transportation choice;
2. Transportation demand management and design;
3. Neighborhood character;
4. Funding sources; and,
5. Regional collaboration.

The policy section of this chapter reflects the comments of participants at various public meetings, resident surveys, and workshops. The majority of these policies focus on an increase in transportation options on a road system that complements the City's diverse land uses.

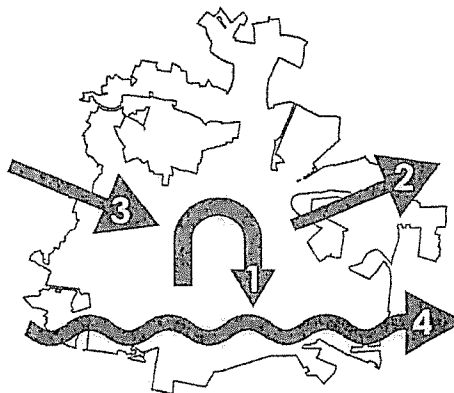
Addressing these concerns will require a number of physical and policy changes, including new and expanded facilities for bicycles, pedestrians, and automobiles; improved intersections; and additional transit service.

MAJOR ISSUES AND OPPORTUNITIES

Our City's transportation infrastructure must serve four distinct markets:



1. Intracity travel, for people who live in Frederick and are going places within its borders.
2. Outgoing travel, for people who live in Frederick and are going places outside its borders.
3. Incoming travel, for people who live outside Frederick and are coming into the City.
4. Pass-through travel, for people moving through the City but don't intend to stop.



	Going to Places Inside	Going to Places Outside
Live Inside	INTRACITY TRAVEL	OUTGOING TRAVEL
Live Outside	INCOMING TRAVEL	PASS-THROUGH TRAVEL

In the questionnaire that was administered in 2019 to launch the 2020 Comprehensive Plan process, residents noted issues with how we handle each of these markets, but one of the most significant issues was the ability of Frederick's transportation system to handle growing demand in all four markets, caused by economic recovery and ongoing growth.

Frederick's commuters come from and go to counties in four states, though the vast majority (over 85 percent) commute within Maryland. The City is a net commuting destination, with 58 percent more people commuting into the City than commuting out of it. This is down from 65 percent in 2010. This may reflect a growing job market in Washington's inner suburbs, allowing Frederick to function as both a center in its own right and a suburb of the District of Columbia. In addition, a sizable proportion of Frederick's residents live and work in the City. In 2017, 9,217 locals held 19% of the City's 48,381 jobs. (US Census Bureau)

Other issues noted by residents included:

- The need to reduce traffic congestion;
- The impact of new low-density residential development on vehicle traffic; and,
- Unsafe speeding and intersections.

Table 3-1: 2017
Commuter Origins and
Destinations

Source:
US Census Bureau,
'LEHD Origin-Destination
Employment Statistics
Data 2017'

	Out-Commute		In-Commute	
All Counties	24,776	100%	39,164	100%
Frederick County, MD	5,479	22%	16,585	42%
Washington County, MD	1,165	5%	4,397	11%
Montgomery County, MD	7,016	28%	3,483	9%
Carroll County, MD	773	3%	2,026	5%
Baltimore County, MD	1,315	5%	1,468	4%
Prince George's County, MD	1,326	5%	1,120	3%
Anne Arundel County, MD	933	4%	874	2%
Adams County, PA	95	0%	845	2%
Howard County, MD	1,250	5%	839	2%
Berkeley County, WV	74	0%	798	2%
Franklin County, PA	86	0%	760	2%
Jefferson County, WV	145	1%	713	2%
Baltimore City, MD	786	3%	611	2%
Loudoun County, VA	727	3%	550	1%
District of Columbia	723	3%	265	1%
Fairfax County, VA	775	3%	262	1%

When given an opportunity to choose three issues as the most important facing the City, residents overwhelmingly chose transportation issues. The top four issues identified by Frederick residents were traffic congestion (43 percent), reduction of sprawl-type development (34 percent), infrastructure financing (30 percent), and transportation network improvements (26 percent). In a similar question, where residents were asked where the City should focus—so not just what the problems are but where should the City look to solve issues—traffic management came in at number one, with 43 percent of respondents.



TRANSPORTATION CHOICE

A safe and effective transportation system allows people to pick or choose whichever mode that best fits their trip need. Unfortunately, in Frederick, given the constraints, in many cases, driving is the only practical and safe travel option. Those who cannot afford a vehicle, cannot drive, and are not served by public transit, then, have a harder time running routine errands or participating in Frederick's vibrant civic life.

Table 3-2: All travel
mode use in Frederick
County

Source:
Metropolitan
Washington Council of
Governments 2017-2018
Regional Travel Survey
Update

Mode	3-5 days per week	1-2 days per week	Few days per month	Few days per year	Only on weekends	At least once in the past year
Car Share	0.10%	0.30%	0.00%	0.20%	0.00%	0.60%
Ride-Hailing (TNCs)	0%	0%	1%	8%	2%	12%
Transit	4%	1%	2%	17%	1%	26%
Commute Carpooling / Vanpooling	5%	2%	1%	2%	n/a	11%
Bicycle Use	1%	1%	2%	2%	3%	8%

Table 3-3: Commute
Mode in Frederick City,
County, and the DC
Region

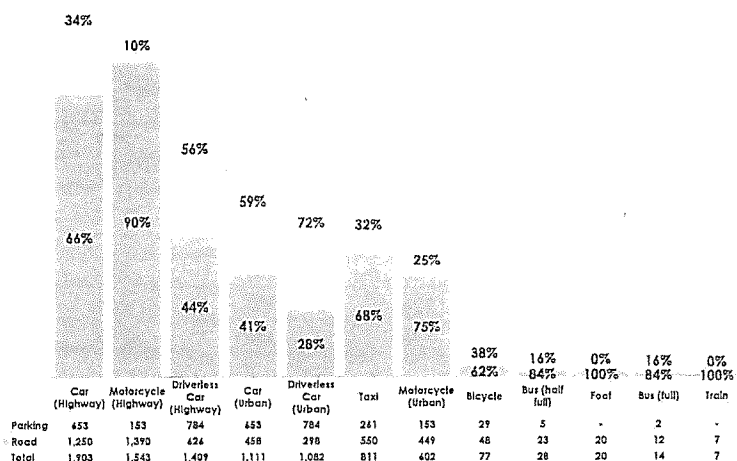
Source:
US Census 2017
American Community
Survey 5-Year Estimates

Mode	City	County	Region
Drove Alone	74%	78%	66%
Carpool	12%	10%	10%
Transit	5%	3%	14%
Walked	4%	2%	3%
Taxi, motorcycle, bicycle, or other	2%	1%	2%
Worked at home	4%	6%	5%

STREETS AND ROADWAYS

Roads are critical to any city's physical form. Every day we walk, bike, and drive on them. They are the most permanent part of any city structure and are much more than thoroughways for vehicular traffic.

Table 3-4: Square feet
Used per Traveler by
Mode in Mixed Traffic



This calculation shows how many square feet it takes to move a typical vehicle with a typical load through City streets and accommodate for their storage. For all vehicles, this includes following distance. For cars, motorcycles, and bicycles, this also includes 4 parking spaces (the national average number of spaces per vehicle). For trains and buses, this includes maintenance facilities like railyards and garages. For private cars, this assumes an average of 1.2 people per vehicle – 1 in 5 cars carries someone else. For taxis, driverless cars, and bicycles, this assumes an average of just 1 person per vehicle. Totals were calculated by the City using data from the Federal Highway Administration and the Transportation Research Board.

Until the popularization of the automobile in the 1920s, cities designed their streets to accommodate most trips by foot, horse, trolley, and train. The Frederick Town Historic District and the City's early 20th Century neighborhoods have many excellent examples of streets designed for foot traffic. However, following World War II, trends as diverse as the popularization of the automobile and federal lending standards encouraging cul-de-sac neighborhood designs and the separation of homes and retail contributed to changes in street design. Driving was actively encouraged, and so streets were designed to only accommodate driving. Because of how much more space is needed to accommodate a car trip instead of walking or bicycle trips (see Table 3-4), distances between homes and shops grew beyond the reach of people on foot. As a result, driving often became the only viable option for those living in the newer neighborhoods of Frederick.

Today, four principal problems face our road system: congestion, public safety, fragmented networks, and inequitable access to transportation facilities.

The first two issues – congestion and public safety – are made worse as the amount of driving increases, as measured by the total number of vehicle miles traveled, or VMT. The second two issues – fragmented networks and inequitable access to transportation – exacerbate problems caused by increased VMT and induce more VMT than the City might otherwise have. Methods to address each issue are interconnected and are described below.



A PRIMER ON VMT

VMT STANDS FOR VEHICLE MILES TRAVELLED, OR THE TOTAL DISTANCE TRAVELLED BY ALL VEHICLES WITHIN A CERTAIN AREA OVER A CERTAIN AMOUNT OF TIME. THIS IS NOT THE AMOUNT OF TRAVEL GENERATED BY THE AREA BUT RATHER THE AMOUNT THE AREA'S ROADS SUPPORT, INCLUDING INCOMING, OUTGOING, AND PASS-THROUGH TRAFFIC.



HOW IS IT MEASURED?

Every state must report VMT to the Federal Highway Administration's (FHWA's) Highway Performance Monitoring System, or HPMS. States measure this in a multistep process:

1. Classify all the roads into one of seven classes:
 - a. Interstate freeway
 - b. Rural principal arterial – other freeways and expressways
 - c. Principal arterial – other
 - d. Minor arterial
 - e. Major collector
 - f. Minor collector
 - g. Local road
2. Count traffic at a number of places along each kind of roadway (except local roads, which will be described later), typically for a 24-hour period on a Tuesday, Wednesday, or Thursday, or all three days, generally during the spring or fall to include school-related travel.
3. Multiply this number by the length of the road where the count took place.
 - a. Extrapolating linear distance from a single point is complex. Advanced modelling techniques take into consideration other count sites nearby, intersections, on/off ramps, and similar features.
4. Annualize this daily VMT data by multiplying it by 365.25. Local road travel can be estimated through models that take into consideration socioeconomic data, land-use patterns, travel on neighboring roads, and many other factors, as local roads typically are not included in the traffic counts described above.

Congestion

Frederick's location at the convergence of several major highways (I-70, I-270, US 15, US 40, and US 340) creates congestion, particularly during the morning and evening peak periods, as well as on Friday nights and Sundays. Much of this traffic originates from outlying communities located far from the City limits. While widening these roads is a first impulse, experience and research has found that road widening only induces more traffic, and any improvement to travel times is short-lived. After only a few years, these projects typically result in the same level of congestion where the improvement was made while also inducing more congestion elsewhere in the system, sometimes even miles from the wider road. They bring the City forward for a time, but then set it back further than it was.

Nevertheless, congestion along regional roadways is a real and significant problem for our community. Almost 85 percent of respondents to the Comprehensive Plan questionnaire said there was a need to improve traffic flow on all kinds of roads. As a growing City in a growing region, we must find ways to accommodate new trips without needlessly increasing travel times or congestion. For many, driving is a necessity. There are several ways to mitigate problems caused by highly-congested roadways directly without inducing congestion elsewhere:

1. Support efforts to charge a decongestion toll for drivers entering downtown Baltimore and downtown Washington, DC during rush hour. While many of Frederick's residents work in these cities' inner suburbs, they compete with inner suburban drivers for road space on I-70 and I-270. Research from Stockholm, Singapore, London, and elsewhere has found that decongestion tolls dramatically reduce traffic in and around the City centers, an effect that could ultimately benefit Frederick commuters even if they never enter either Baltimore or Washington. This would also be in line with strategic initiatives calling for City advocacy for safer and more efficient traffic flow on the two interstates.
2. Support all-day, every day, two-way transit service from Frederick to the I-270 Corridor, the WMATA Red Line, and Union Station, as well as along the I-70 Corridor. While research has found that new or expanded transit service may not reduce traffic, as new drivers take the place of those who switch to transit, new transit expands options to those who want to avoid traffic, reducing impact on the community. This would enable people to bypass off-peak congestion and reduce the congestion impacts of out-of-town residents attending major events Downtown.
3. Support teleworking. Recent work done over the course of the COVID-19 Pandemic shows that a shift of 5-10 percentage points away from private vehicle use to teleworking can have a significantly positive impact on traffic congestion, reducing peak demand especially in the morning hours. However, it is currently unclear if, like transit, such a shift towards telework would be subject to the fundamental law of traffic congestion and be temporary or if it would represent a permanent change. Even if congestion improvements prove temporary, telework would allow some residents to avoid traffic and reduce traffic impacts on the community.
4. Support and enact transportation demand management (TDM) programs, including parking reforms, promoting biking-to-work, increasing the availability of carsharing services like ZipCar or Free2Move in the City, and subsidizing transit passes. Commuter and employer programs that already exist in the County's TDM program include ridesharing,

vanpooling, commuter benefits, and commuter plan development. The State offers TDM resources through its Commuter Choice Maryland and Commuter Connections programs.

5. Support and enact transportation system management (TSM) programs, including timing traffic lights and installing ramp signals to help manage how congestion forms.

Public Safety

Driving is the most dangerous thing people do on a regular basis. The Centers for Disease Control (CDC) identifies it as a leading cause of death in the United States, and every year over 30,000 people in the United States are killed in car crashes. Research and experience from elsewhere in the region have found that the link between VMT and crashes and deaths is highly elastic: as VMT increases, crashes and deaths increase even faster. Driving is also associated with higher incidences of obesity, heart disease, and stress. Taken together, overreliance on driving as the dominant means of

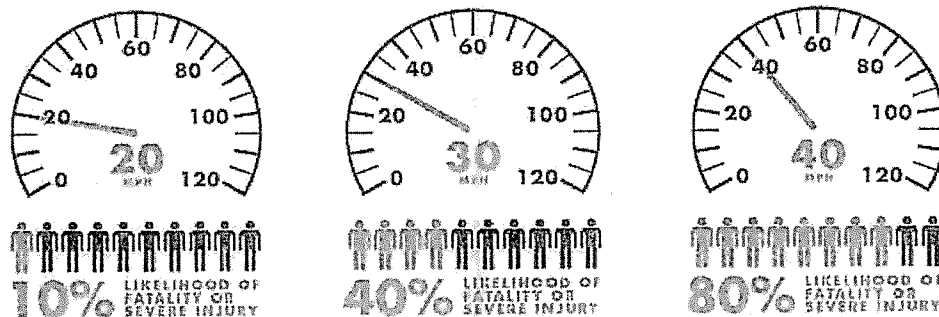
Table 3-5: Crash Data for The City of Frederick, 2015-2018

Source:
Frederick Police
Department

	2018	2017	2016	2015
Crashes	2,690	2,647	2,700	2,506
Injuries	389	409	371	302
Fatalities	0	1	0	0

Figure 3-1: Death Due to Speed

Source:
US Department
of Transportation,
Literature Reviewed on
Vehicle Travel Speeds
and Pedestrian Injuries,
March 2000



Unsafe driving was a consistent theme in Questionnaire comments, with speed being the biggest factor.

There are several possible ways the City might address public safety directly:

1. Have police and engineers work together to identify trouble spots and how the roadway's engineering may have contributed to crash danger without diminishing the usefulness of the road for vulnerable users, such as those on foot or a bicycle.
2. Explore ways to improve traffic enforcement, including ticketing drivers who fail to yield to pedestrians in a crosswalk and increasing the number of red light and speed cameras at trouble spots.
3. Reengineer streets to accommodate the desired speed limit or below, to encourage safe driving without enforcement. Current traffic engineering practice is to design roads to accommodate speeds 10 miles per hour over the posted speed limit as a safety precaution for drivers, so a road limited to 25 miles per hour is designed to accommodate 35 mile per hour traffic. While this practice reduces the frequency of crashes, it subconsciously encourages accidental speeding and increases crash severity, especially for people on foot.

4. Adopt the recommendations of Metropolitan Washington Council of Governments (MWCOC) Transportation Policy Board (TPB) Resolution R3-2021. This resolution came out of a detailed analysis of crash types throughout Metropolitan Washington and included a suite of potential mitigation measures. Adopting the recommendations would request the City to examine how each mitigation measure might be applied to City streets, plans, and programs in the Public Works and Police departments.

AN INTEGRATED MOTOR VEHICLE NETWORK

It is the responsibility of the City to have a functional and integrated roadway network that connects the City to the larger regional roadway network. In case of emergencies, redundant access points allow emergency vehicles to get where they need to go even when one of the access points is blocked. While the historic downtown is marked by a grid pattern of streets, creating significant redundancy, neighborhoods marked by curvilinear streets and cul-de-sacs are becoming increasingly common outside the City core. These mid-century street networks create bubbles that are difficult to serve or access. The City needs to continue to work with developers to ensure new neighborhoods are interconnected with the rest of the City and are planned so they can easily connect to future potential developments.

Planning for a highly redundant and interconnected road system can spread traffic through the network, removing the chokepoints that constrain traffic flow. When Milwaukee, Wisconsin, removed a segment of freeway from its downtown, extreme congestion did not materialize as predicted. Instead, the City's robust grid system simply absorbed the traffic, and rush hour travel times improved.

A highly interconnected network can also reduce VMT. Pedestrians and bicyclists are able to navigate an interconnected network more easily than winding routes that include dead-end streets and cul-de-sacs. If it is significantly faster to drive, then people generally will, especially if the layout of the street network forces a spatially longer journey than might otherwise be needed.

A Master Streets Plan would allow for the City to grow with intentionally high redundancy and interconnectivity of the street network in mind. Should the City choose to adopt such a plan, it would lay out where the City intends to locate arterial and collector roads and potentially even expand its local gridded street network, depending on the scope of such a plan. While this would also include a traffic study of major corridors, such as MD-26, here are no currently plans to do so outside of such a plan or as part of a standalone project.

In that vein, there are already two major roads planned for the City, and they are detailed below.

Christopher's Crossing Loop

A recent change to traffic patterns has been the construction of a ring road designed to form a complete loop around the City. When all segments of this road – composed of Monocacy Boulevard and Christopher's Crossing – are complete, this route will alter circulation and improve redundancy. The City should remain focused on construction projects that support this system. The City's support for completion of this route should be two-fold: the CIP should continue to include the projects related to this road, and the City's leadership should continue to pursue additional funding from County, State and Federal agencies as appropriate.

In October 2009, the City of Frederick and US Army Garrison Fort Detrick established a Memorandum of Understanding agreeing to work cooperatively to complete all matters relevant for granting a right-of-way to the City across Area B of Fort Detrick for Christopher's Crossing, including matters relating to environmental issues in Area B. The MOU establishes the coordination necessary for consideration of granting a right-of-way across federal property. It was the goal of both parties to complete all matters necessary for the granting of the right-of-way by May 2010. And though that time has passed, both parties continue to work cooperatively to investigate the proposed alignment.

In the decade since the alignment for this segment of Christopher's Crossing was first shown through Area B, new data from monitoring wells has revealed contamination large enough to place part of Area B on the National Priorities List as a Superfund Site. The contamination is not contained within the Fort Detrick fence line and according to the EPA, has not yet been formally or fully characterized nor has a remediation strategy been selected. In light of this, the City continues to consider alternatives to building a road through Area B including widening existing Kemp Lane.

North-South Road Network

Another major redundancy link is the proposed North-South Road Network. Rather than a single roadway, this effort consists of both a newly constructed arterial road and improvements to existing roads, including Linganore Road and MD 194, to improve connectivity. Primarily, this road can benefit the City by linking MD 26 to MD 144, thereby establishing a direct link between important commuter origin points without traveling on US 15 through the City of Frederick.

Past comprehensive plans have shown a singular limited-access highway between US 15 along the east side of the City to as far south as either MD 355 or I-270. There have been a variety of problems identified with this alignment, including wetland and parkland to the south and limited usefulness north of MD 26. The current plan indicates that these connections may be pursued in the future, but they are not key to the success of the project.

Biggs Ford Road Interchange

The Biggs Ford Road interchange will accommodate future growth in the area and improve traffic safety by eliminating an at-grade crossing of US 15, providing for a more redundant and safer east-west traffic system.

Mount Philip Road Interchange

The proposed interchange at Mount Philip Road will serve as a primary connector for accessing Christopher's Crossing from I-70 from the west side of the City. This will reduce traffic demand on US 40 west of Waverly Drive and reduce turning movements at the intersection of Christopher's Crossing and US 40, allowing for a smaller and more pedestrian-friendly intersection at that location.

THE PARKING SYSTEM

Integral to our vehicular transportation system is parking, what we do with our vehicle once we get where we're going. On-street parking has existed since cars were first invented. As cars became more popular, drivers would park along residential streets, crowding out residents who needed neighborhood curb space for vehicle storage. Off-street parking requirements and off-street parking garages were created to create more storage space and encourage nonresidents to keep their cars out of neighborhoods.

While the focus of this section will be the City's historic center, parking touches all areas of the City.

Free off-street parking, common and often required by City land-use provisions outside of the core, is not truly free. A single surface parking spot can cost thousands of dollars to build and maintain, a cost that is passed along to consumers and renters. Surface parking also increases the distance between destinations – distances between storefronts on opposite sides of West Patrick Street can be up to 600 feet as the crow flies, and 1,700 feet (a third of a mile) on foot once street crossings are taken into account. Surface parking can also increase the distances utilities and services need to travel to get to buildings, increasing costs to ratepayers and taxpayers.

An ongoing challenge will be to balance the benefits of surface off-street parking to drivers with their impacts on the City's landscape and residents who either cannot or prefer not to drive.

Downtown parking

The City aims to provide access to its dense Downtown neighborhood by all modes: walking, biking, transit, and driving. Given the large spatial needs of driving and the shortcomings of current infrastructure for other modes of transportation, the City has made a significant effort to accommodate drivers by establishing a Downtown parking system. Through its two primary parking products – curbside and garage parking – the City has taken a customer service approach to satisfying parking needs within Downtown.

Curbside

Within Frederick's historic downtown and other older neighborhoods, most parking is on-street. The original plan for Frederick did not account for rear property access through a planned network of rear alleys and so garages were not able to be built as cars became more popular. While some alleyways have been built since 1765, most residents and businesses rely exclusively on parking spots in otherwise public space.

To accommodate on-street parking, the City aims to provide at least one open parking space per block at all times, a goal accomplished through a range of policies:

- Residential parking permits. The permits allow Downtown residents to purchase a permit, allowing them to park in areas reserved for residents.
- Paid parking. For a small fee per hour, people can park for a set amount of time, encouraging people to try parking in the public garages (see next section) and reserving the public realm for drivers who feel they most need it.
- Time-limited parking. In several places around the City, people are limited to a certain amount of time, allowing increased turnover and giving more shoppers a chance to access Downtown.

To address ongoing issues with a shortage of curbside parking, the City might implement the following policies:

- To address supply problems, the City might pursue the construction of new alleyways to allow people rear access to their properties.
- Where alleyways already exist, determine whether rear parking is not used and what might encourage its use.
- To address demand problems, adapt curbsides as needed to accommodate other means of access to Downtown, whether those are

- ride-hailing services like Uber, protected bicycle lanes, or wider sidewalks.
- Restricting certain blocks to resident-only parking should be explored on a case-by-case basis.

Garages

The City also provides five public parking garages in the Downtown core. Together, these garages provide 2,478 spaces for Downtown workers and visitors. The newest spaces are provided in the East All Saints Street Garage.

There are three classes of user for the garage system: City and County employees; monthly pass holders; and daily users. The City and County are granted a certain percentage of spaces based upon how much of each garage they funded. Monthly pass holders pay \$97 per month to enter and exit an unlimited number of times per month. Daily parkers pay a flat fee of \$1 per hour to a maximum of \$12 per day, with slightly different fee structures for Sundays and evenings.

Together, the monthly pass holders, City employees, and County employees use approximately 85 percent of all parking spaces in garages during the workday. When taken on top of the needs of daily users, the City's garages are effectively full during the workday.

Garages, as large purpose-built buildings, present a unique suite of challenges. Each garage needs regular maintenance and overhauls; security cameras and security personnel; payment equipment; and parking attendants. This is on top of the ongoing capacity challenge and the need to replace or renovate older, obsolete garages. Additionally, autonomous vehicles may render current garages obsolete entirely. To address these needs, the City might pursue the following policies:

1. Address parking supply by:
 - 1.1. Finding new streams of revenue to fund new garages.
 - 1.2. Build new parking structures to provide parking required to keep up with expected growth. The Downtown Parking and Circulator Study, underway as this report is being drafted, will address potential locations for new garages and potential supply-side solutions to increased demand.
 - 1.3. Implement the remote parking recommendations of the Downtown Parking and Circulator Study, underway as this report is being drafted.
2. Address parking demand by:
 - 2.1. Exploring, funding, and building effective infrastructure for other modes of transportation in and through the City.
 - 2.2. Add additional bicycle parking spaces.
 - 2.3. Explore charging different monthly prices for different garages, as demand allows.
3. Continue to provide high-quality customer service with new technologies and attention to new and developing trends in transportation.
4. Approach new garage design with flexibility to ensure ease of adaptation for potential connected and autonomous vehicle usage.

Electric Vehicles

As electric and other zero-emission vehicles (such as fuel-cell vehicles) become more common in coming years, it is critical that the City adjust its parking and building regulations to facilitate the adoption of these vehicles and the phasing-out of internal-combustion engine vehicles. The 2018 *Plug-In Electric Vehicle Charging Infrastructure Implementation Plan for the City of Frederick* provides the roadmap for accommodating electric vehicles in the City.

AN INTEGRATED BICYCLE NETWORK

According to a 2019 study by the consultancy INRIX, 48 percent of all trips in the United States are 3 miles or less (*Reed, Managing Micromobility to Success*). Given the small size of the City, with no place of the City more than 5 miles away from Square Corner, bicycling could be a major piece of Frederick's transportation system. Residents agreed, with 67 percent of Questionnaire respondents indicating a need for more on-street bicycle routes and 78 percent saying the same of off-street bicycle routes. Just 19 percent of respondents said they don't bicycle because they prefer to drive, with the vast majority of people indicating that an incomplete or unsafe network was the primary barrier to bicycling.

Historically, bicycling has been viewed as a recreational activity and City infrastructure has followed that view. People bike on trails that are built through parks and along floodplains. However, these trails are often not connected to the street grid, meaning it is difficult to access the entirety of the City by bicycle. There is little infrastructure available for bicycling to be used as transportation for everyday trips.

Not all infrastructure is appropriate for a given road. Surveys of national sentiment on bicycling found that around half of people are "interested but concerned" about bicycling, saying that they would ride if it felt safer. According to the National Association of City Transportation Officials (NACTO), conventional bike lanes and "sharrows" – painted arrows on the asphalt – are only appropriate on the quietest side streets. Streets with speeds higher than 25 miles per hour or even a moderate volume of vehicle traffic should be served by protected bike lanes, which feature physical barriers separating cyclists and drivers. To the greatest extent possible, this network should enable anywhere-to-anywhere travel, allowing people to use a bicycle for any trip they like.

The City of Frederick is also part of the National Capital Trail system, which reaches every member jurisdiction of MWCOC. As the City continues to build its shared-use path network, links to the broader trail network would allow for significantly more opportunities for recreational and utility bicycling around the County and the region at large.

— EXISTING
— PLANNED FUTURE
— PROPOSED

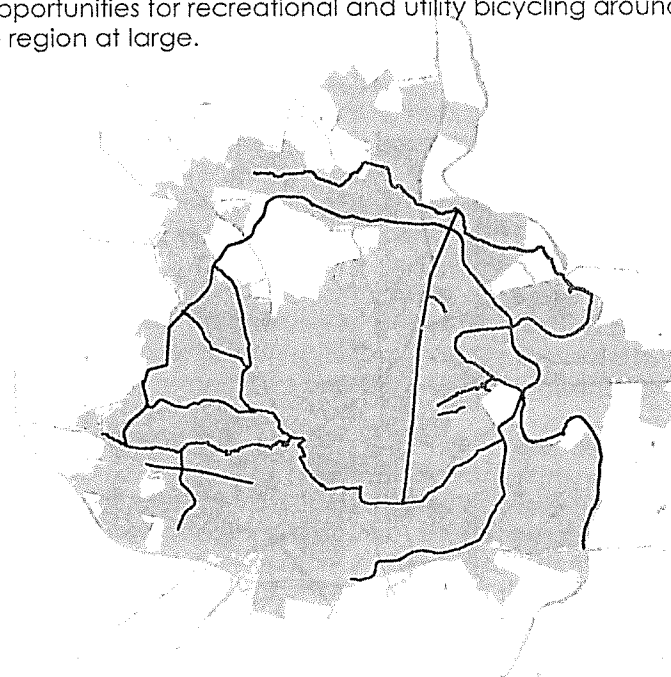


Figure 3-2: City Path Plan

As a result of a recommendation in the 2010 Comprehensive Plan, the City has established an active and involved Bicycle/Pedestrian Advisory Committee. Thanks in part to their efforts, bicycle lanes are on 7th Street and North Market Street from 7th Street to 9th Street, and planning has begun on protected bicycle lanes on North Market from 9th Street to MD 26. The City should continue to build an integrated network with measures such as:

1. Determining which roadways can accommodate bicycle lanes without reducing parking or reducing Level of Service for a given roadway below Level E.
2. Taking a survey to determine the number of people in Frederick who are similarly "interested but concerned" about bicycling in the City.
3. Commissioning an on-street bicycle plan that would show how the City might build a complete network that integrates with the County and State bicycle facilities and plans.
4. Updating roadway standards to incorporate appropriate bicycle infrastructure for each roadway type and adding new standards for bicycle-primary streets consistent with NACTO's All Ages & Abilities design guidance (see Table 3-6).

Table 3-6: NACTO Contextual Guidance for Selecting All Ages & Abilities Bikeways

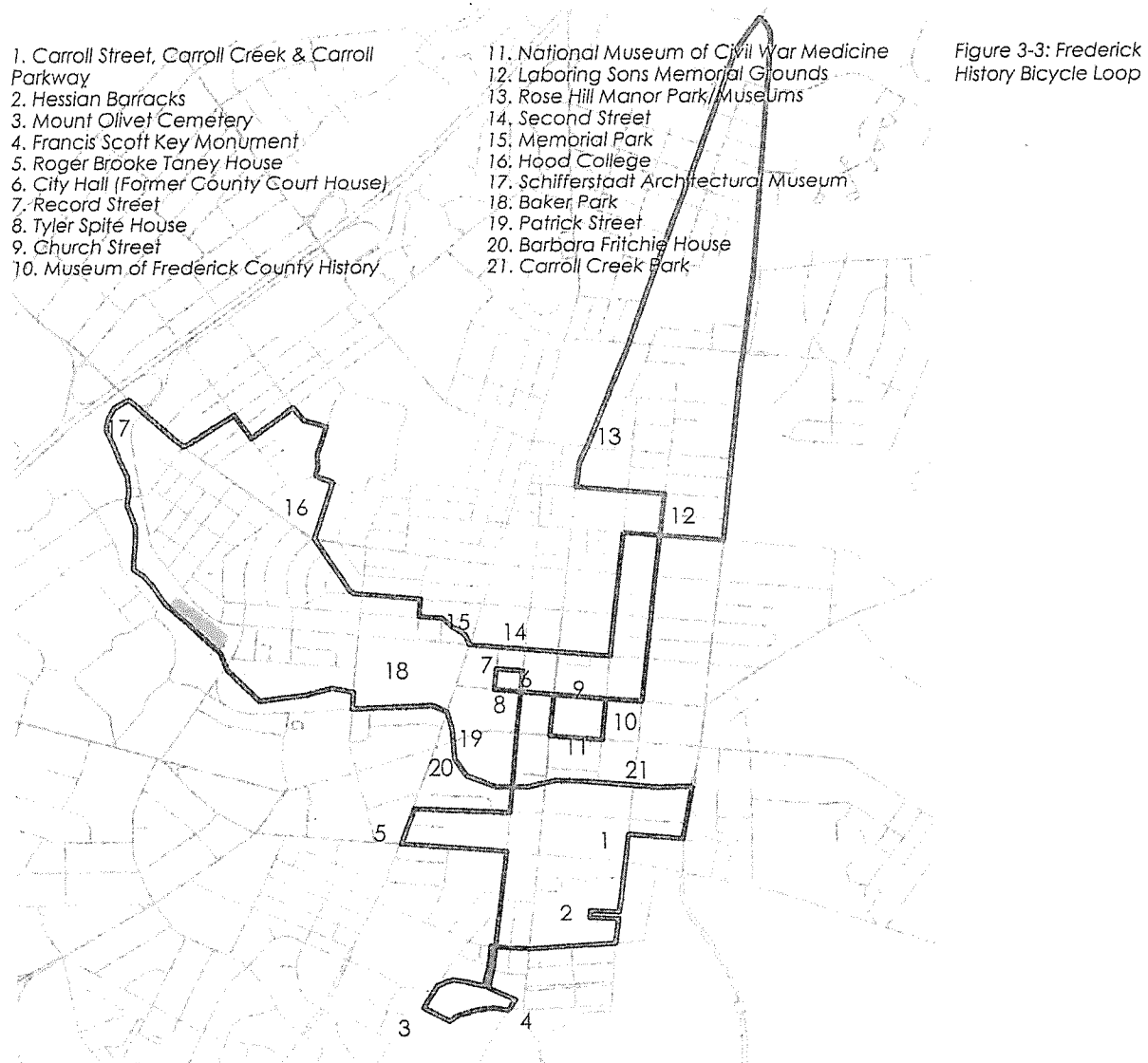
Source: "Designing for all ages & Abilities: Contextual Guidance for High-Comfort Bicycle Facilities." New York, NY: National Association of City Transportation Officials, December 2017.

ROADWAY CONTEXT					All Ages & Abilities Bicycle Facility
Target Motor Vehicle Speed	Target Max. Motor Vehicle Volume (ADT)	Motor Vehicle Lanes	Key Operational Considerations		
Any	Any	Any	Any of the following: high curbside activity, frequent buses, motor vehicle congestion, or turning conflicts		Protected bicycle lane
< 10 mph	Less relevant		Pedestrians share the roadway		Shared street
≤ 20 mph	≤ 1,000-2,000	No centerline, or single lane one-way	< 50 motor vehicles per hour in the peak direction at peak hour		Bicycle boulevard
	≤ 500-1,500				
	≤ 1,500-3,000	Single lane each direction, or single lane one-way			Conventional bicycle lane or Buffered bicycle lane or Protected bicycle lane
≤ 25 mph	≤ 3,000-6,000		Low curbside activity, or low congestion pressure		Buffered or protected bicycle lane
	> 6,000				
	Any	Multiple lanes per direction			Protected bicycle lane
		Single lane per direction			Protected bicycle lane, or reduce speed
> 26 mph	≤ 6,000	Multiple lanes per direction	Low curbside activity, or low congestion pressure		Protected bicycle lane, or reduce to single lane and reduce speed
	> 6,000	Any	Any		Protected bicycle lane, or bicycle path
High-speed limited access roadways, natural corridors, or geographic edge conditions with limited conflicts		Any	High pedestrian volume		Bike path with Separate walkway, or Protected bicycle lane
			Low pedestrian volume		Shared-use path or Protected bicycle lane

An emphasis on on-street bicycling infrastructure should not come at the expense of bicycling as recreation. Quite the opposite – as more people bicycle for transportation, it will be easier, faster, and safer for visitors and residents to access recreational trails.

An example of where the intersection of bicycling for both transportation and recreation could provide benefits to residents and visitors of the City is the potential to enhance and increase usage of Frederick's award-winning Historic Bicycle Loop. The Loop allows people to explore and learn about Frederick's large and well-preserved historic core as well as its significant resources in outlying areas. This area is too large to experience easily on foot, but by bicycle it can come alive. An on-street network of all-ages bicycle infrastructure would be a major boon to this Loop, inviting families to bike Maryland's largest historic district.

A goal of this plan is to extend our ability to interpret history along existing and proposed bike routes.



AN INTEGRATED PEDESTRIAN NETWORK

The most basic way to travel is either on foot or in a mobility device, such as a wheelchair or motorized scooter. While much of the City has adequate sidewalks, crosswalks, and curb ramps, especially in newer areas, some areas have impassible or even missing infrastructure. At some locations, this is due to historically preserved drainage systems that channel water across the pedestrian right-of-way to the street. At others, it is due to rarely-maintained concrete. Still others are blocked by utility poles, signage, or other street amenities that force people onto substandard surfaces like uneven bricks. And, for someone in a wheelchair, there is little more frustrating than getting to the end of a block only to find no ramp to cross the street.

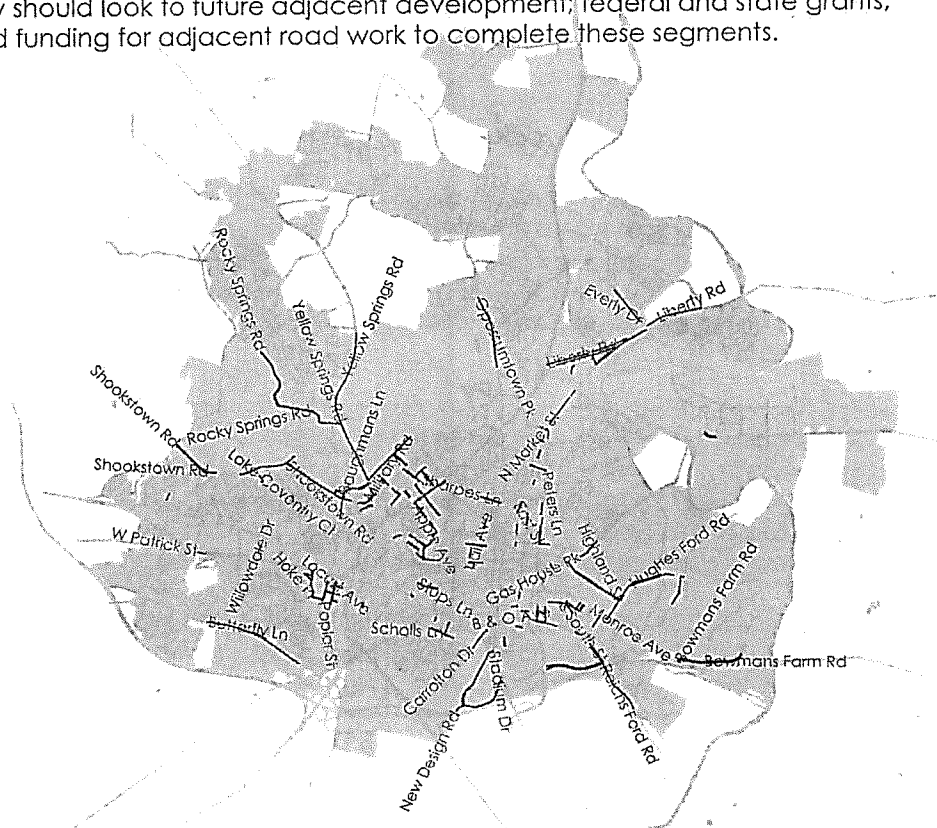
A complete network of sidewalk infrastructure generally involves four aspects:

1. Ensuring at least five feet of uninterrupted wheelchair-accessible pavement runs along every block in the City, and even more in the downtown core where appropriate.
2. Ensuring crosswalks are safe and clearly marked.
3. Ensuring maintenance is regularly conducted on sidewalks and crosswalks.
4. Ensuring every pedestrian crossing has a ramp oriented toward the crosswalk.

Walkable neighborhoods are also important to City residents. 69 percent of Questionnaire respondents said a pedestrian-friendly neighborhood is appealing, and 61 percent said the same thing about having a sidewalk.

The City's missing sidewalk connections, shown below, should be built. The City should look to future adjacent development; federal and state grants; and funding for adjacent road work to complete these segments.

Figure 3-4: Frederick's Missing Sidewalks



AN INTEGRATED FREIGHT NETWORK

Freight flows to, through, and from Frederick. Large trucks are a common sight on East Street, South Street, Monocacy Boulevard, and US 15, and they connect Frederick's economy to the rest of the world. These trucks have particular needs and pose particular challenges to our transportation network including large and dangerous blind spots; significant weight; large turns; and widely spaced wheels. To better manage freight movement within the City, the City needs to identify roads that are most likely to see freight movement and plan the pieces of its road infrastructure – motor vehicle, bicycle, and sidewalk – to accommodate these added challenges.

Freight also means delivery services to businesses and homes. Such services require curb space, a precious commodity in a dense area like Downtown Frederick, or accommodations for double-parking. If not properly accommodated, delivery services may end up blocking bicycle lanes or causing traffic congestion at busy hours of the day by blocking through-lanes, either of which creates inconvenient and dangerous conditions for road users. Accommodations could include programs such as allowing double-parking during times of low traffic for commercial vehicles.

ROAD DIETS AND THE REALLOCATION OF SPACE

As described earlier, cars use a significant amount of space in our cities even while in motion, but this can be decreased to some degree with a road diet, a catchall term for any narrowing of the road, even if there are no lanes removed.

A road diet reallocates some paved roadway space for purposes other than through-traffic. At its simplest, it narrows traffic lanes to better fit the road's purpose. A 12-foot-wide lane is appropriate for highway speeds, but 10 feet may be more appropriate for a minor arterial road. If a minor arterial currently has 12-foot-wide lanes, it might be wise to narrow them by a couple of feet, giving the extra road width to sidewalks or a median.

At its more complex, a road diet may remove a lane to right-size the road to the amount of traffic it handles daily. If a road was built to handle 50,000 vehicles per day but now only handles 25,000, it might be wise to remove a lane and give that road space to some other use: a center turn lane, a protected bicycle lane, sidewalks, street parking, a bus-only lane, or something else.

At times, however, there may be a need to conduct a road diet even when the road is carrying as many vehicles as it is designed to handle. This may occur when carrying private vehicle traffic is determined to be not the highest and best use of that paved surface, for instance if there is a particularly great need for a protected bicycle lane; if sidewalks are too narrow; or if a parallel road has excess capacity but is for some reason unfit for dieting.

Each of these kinds of diets improve the efficiency of a city's paved roadway network. They ensure rights-of-way and surplus paved surfaces are programmed to maximize value to City residents while also improving safety for all users by slowing traffic.

Paved surfaces and publicly controlled rights-of-way are a valuable resource like any other. How the City invests them and to which transportation network reflects the values of the City.

TRANSIT

Frederick is served by five transit services:

1. Transit buses, operated by the County, serve destinations around the County and within the City, operating 6 days a week with no service Sundays. All Transit buses also have bicycle racks, enabling multimodal first/last mile travel.
2. MARC Train, operated by the State, serves commuters that work south in the District of Columbia's inner suburbs and within the District itself by servicing the WMATA Red Line and Union Station. Three trains go south in the morning and three north in the evening during the workweek. This is supplemented by Transit's Meet-the-MARC shuttle service, which allows commuters to access trains at Point of Rocks station.
3. MTA Commuter Bus, also operated by the State, allows commuters to access the western side of WMATA's Red Line as well as inner suburban destinations. Like MARC trains, commuter buses run south in the morning and north in the evening.
4. Greyhound Lines intercity buses is a private operator that connects Frederick with Chicago, Cleveland, Philadelphia, Baltimore, and Washington, DC, with transfers to points around the country.
5. BayRunner Shuttle is a private operator whose intercity and airport shuttle service connects Frederick with Baltimore, BWI Airport, and Western Maryland cities.

National transit ridership trends have been negative since the start of the decade. Since 2011, overall national ridership has declined 5.8 percent. Bus service has declined more, by 16.1 percent. In the DC region, the overall trend has been similar, due in part to ridership woes on WMATA's Metrorail system. Here, ridership fell by 12.9 percent overall and 8.7 percent on buses specifically. Frederick's Transit has seen a much sharper decline of 28.4 percent. The annual decline seems to have hit a bottom in 2018, however, with Transit posting an approximately 0.6 percent increase in ridership in 2019. Regional trends were also positive in 2019, with the DC area seeing growth of 2 percent overall and 1.5 percent on buses specifically.

Ridership on MARC's Brunswick Line, which serves the City, has remained essentially flat since 2010. Ridership from Monocacy Station, south of the City, remains higher than ridership from Frederick's station, likely due to the larger and more accessible parking lot near that station and the lack of supportive density around downtown Frederick's station.

Table 3-7: Annual Transit Trips

Source:
National Transportation
Database, 2019

Year	Frederick	Region		National	
		All Transit	Local Bus	All Transit	Local Bus
2011	836	587,610	256,414	10,208,520	5,171,420
2012	910	597,575	265,952	10,471,578	5,275,400
2013	864	580,547	257,238	10,528,324	5,166,092
2014	839	585,227	266,779	10,633,294	5,097,647
2015	761	586,782	268,280	10,496,457	5,026,601
2016	678	551,572	255,837	10,368,540	4,871,171
2017	637	514,952	241,868	10,063,372	4,616,072
2018	595	502,142	230,734	9,636,478	4,383,469
2019 (est)	599	511,955	234,145	9,618,883	4,337,149

As discussed in the section on Congestion above, thanks to induced demand, transit cannot reduce congestion significantly. However, better transit reduces the *impact* of congestion on a community, giving people the option to bypass or ignore congested roadways. 75 percent of Questionnaire respondents said that improving and expanding local transit should be a priority for the City, and 80 percent said the same of regional transit. Almost half of respondents said better regional transit was urgently needed.

While the City doesn't fund or operate transit itself, there are a few critical gaps that might be explored and even solved by the City in cooperation with the County and State:

1. Sunday TransIT service. TransIT today does not provide Sunday service, leaving those who rely on transit stranded for the day. This may have impacts on religious observance, socializing, shopping, and any other activity a person might do on a given Sunday.
2. All-day, all-week service to and from the rest of the DC region. Infrequent and indirect service is available on Greyhound and BayRunner buses via Baltimore or BWI, but the schedules have limited usefulness for daytrips, and State-provided service does not operate in off-peak hours or in off-peak directions. The City might investigate supporting bidirectional bus service from the City to the Shady Grove Metro Station.
3. Identifying gaps in paratransit and fixed-route transit. While the remit of TransIT is to provide service to the whole County, there may be pockets of the City with unacceptably poor transit access. Identifying and understanding the scope of these pockets would provide a roadmap to filling them.

Transit-Oriented Development

While none of the transit operators servicing the City are operated by the City, decisions made by the City can help ensure healthy use of transit and integrate it into the fabric of the City's transportation network. Among these are encouraging transit-supportive land uses, ensuring walking to potential transit corridors is feasible within new developments, and strategically locating bus-only lanes along highly congested roads. The City will also be an advocate for more effective transit service to and through the City.

Transit-supportive land uses, also known as Transit-Oriented Development (TOD), are a kind of development pattern specifically designed to improve transit ridership. Generally, the most successful projects have the following characteristics, each of which take advantage of practical research into human behavior towards public transit:

1. TOD extends a half-mile walking distance (or about 15 minutes on foot) from a rail station or a quarter-mile (about 7 minutes) from frequent bus service, as this is how far the average person is willing to walk from home to transit. A typical person is willing to walk about half this distance to work from transit.
2. TOD utilizes a road grid to maximize the area walkable from the transit stop.
3. TOD consists of rings of primary uses around a rail stop: first retail for one-eighth of a mile, then office out to one-quarter of a mile, then homes out to a half-mile. (Each distance is cut in half for bus transit.) While these uses overlap, so homes may be within every part of the TOD, these primary uses become less common as one moves away from their part of the TOD. These ring distances are roughly the distance people are willing to walk from a transit stop to that particular use.
4. TOD places denser uses towards the transit stop.

Transit-supportive land uses can also be implemented where there is no existing transit in order to anticipate and support better transit in the future. For instance, a developer might place higher density development or a destination such as a park adjacent to a major collector or arterial road which a bus is more likely to serve.

Experience from the rest of the Region has found that micromobility sheds – the area around a transit station accessible by bicycle, scooter, and the like – can spread the usefulness of transit-supportive land uses beyond the traditional half-mile walking radius to up to 2 miles. Ensuring easy access to the land-uses and the transit stop itself maximizes the transit investment and the productivity of the development.

Maryland allows counties to designate transit-oriented development areas around high-capacity transit stations, such as Downtown Frederick's MARC station. Doing so allows jurisdictions to unlock certain funding mechanisms, including tax-increment financing, which can then be used to enhance the development area. These might be parking structures, street beautification, affordable housing subsidies, bicycle lanes, road redesigns, and more. In Frederick, for instance, trains must sound their horn as they approach the station, reducing the quality of life for neighbors. Upgrading intersections to create "quiet zones" is an expensive undertaking, but one that could be done with TOD-related funds.

The City should work with the County to pursue a TOD designation that makes sense for its MARC station area.

Golden Mile Multimodal Access

The Golden Mile Multimodal Access Enhancement project will be a significant improvement to bus transit service along one of the City's primary commercial corridors. The project will install bus-only lanes in the westbound direction, allowing buses to run more efficiently by allowing them to skip parking lots. This will speed trips and save on operating hours, freeing operating funds for Transit to reinvest in bus frequency or coverage. Just as importantly, a shared-use path will be constructed adjacent to the bus lane to accommodate the many nearby residents the walk and bike in the corridor.

NEW TRANSPORTATION SYSTEMS

Over the past decade, urban transportation options have broadened significantly, with the advent of car sharing like Zipcar; micromobility like bike and scooter sharing; transportation network companies like Uber and Lyft; the possibility of new bus rapid transit and express toll lanes; and the first tentative steps towards autonomous vehicles. As the City looks towards its future, it must be open to participating in newly-established transportation systems and proactive in planning for potential disruptions.

Car Sharing

Car sharing companies allow people to rent vehicles for short-term use, generally less than an hour. While each company has its own model, broad themes are present. Zipcar, the first major car sharing company in the United States, uses dedicated parking spaces on streets, in garages, and in parking lots to store its fleet. Members can rent any vehicle in the fleet either for a daily flat rate or by the half-hour. Members reserve a time slot in a given vehicle and must return it to the vehicle's designated spot.

A second model, pioneered by Car2Go (renamed, as of 2020, ShareNow), allows users to pick up and drop off vehicles anywhere within the system's boundaries. In Washington, DC, where the company operated until early 2020, those boundaries corresponded to the boundaries of the District, with certain areas like Rock Creek Park being off-limits for drop-offs. Unlike Zipcar, which requires users to make round trips, ShareNow enables users to make one-way trips. While more flexible, this model requires a certain density of users to ensure cars remain in use. Fees are either a flat rate for a certain amount of time or by the minute.

The benefit of car sharing is that it enables people to not own a vehicle but still have access to a vehicle. Studies on the subject have found that each car sharing vehicle in use can reduce parking demand by four spaces at a minimum. Further, members of car sharing networks drive less, reducing VMT and, therefore, also reducing pollution and traffic congestion. Currently there are no car sharing services that operate within the City of Frederick outside of Zipcar, which is currently available at Hood College. Partnering with ZipCar to expand to other neighborhoods or inviting pilot allow people to live car-free without sacrificing their ability to fully access the City's amenities.

Zipcar is currently available at Hood College. The City may wish to investigate expanding service to other neighborhoods and integrate it into new apartment projects. Inviting pilot programs from other companies may also be fruitful.

Zero Emission and Electric Vehicles

Zero emission and electric vehicles are vehicles that do not operate by burning gasoline or other fossil fuel products, instead operating on electricity, solar, or hydrogen power. Zero-emission vehicles have existed for over a century, including trolleybuses, electric trains, cable cars, and personal automobiles. In 1900, over a quarter of automobiles on the road were electric and could carry a range of up to 70 miles on a single charge. In Frederick, the Hagerstown & Frederick Railway operated on electric power. However, mass production of internal combustion engines, cheap oil, and greater range of internal combustion engine-powered vehicles led to the decline and ultimate end of the early electric era.

Since the 2010 Comprehensive Plan, zero emission and electric vehicles (EVs) have seen a resurgence in popularity and are poised to displace internal combustion engine (ICE) vehicles. California, Norway, Denmark, and Sri Lanka, among many others, have already announced plans to phase out new ICE vehicles entirely over the next 10 to 20 years. Given that a significant portion of the United States' road infrastructure is funded by gasoline taxes, this has the potential to dramatically disrupt transportation finance in coming years. It could also mean the decline or closure of gas stations as at-home and parking-lot charging stations become more common.

In Frederick, the 2018 *Plug-In Electric Vehicle Charging Infrastructure Implementation Plan for the City of Frederick* provides the roadmap for accommodating electric vehicles in the City. Among its recommendations are updating building codes, accommodating more electric vehicle charging in public garages, and determining locations for new charging stations. These will help accommodate and increase adoption of electric vehicles in the City.

A potential concern with zero-emission vehicles is their low cost of operation. While this is a boon to users, the cost of driving has a direct and appreciable impact on VMT: as costs increase, driving decreases, even a bit. This will run counter to the other goals of this chapter, which include promoting active transportation modes, reducing per-capita VMT, improving public safety, and decreasing congestion. The City should keep a close watch on state and federal policies that might decrease VMT in a post-ICE infrastructure environment and promote their adoption.

Micromobility

As discussed above under An Integrated Bicycle Network, 48 percent of all trips in the United States are 3 miles or less, and micromobility – bicycle- and scooter-share – could replace half of those (*Reed, Managing Micromobility to Success*). Given the small size of the City, with no part of the City more than 5 miles away from Square Corner, micromobility could have a dramatic impact on how people experience and travel in the City.

The two dominant models of micromobility are similar to those of car sharing. One, pioneered in the region by Capital Bikeshare, establishes set docks for its bikes. Members may ride the shared bikes to and from docks, allowing one-way trips but also requiring a certain density of docks to allow for easy rebalancing, and to ensure there are enough vehicles or docks in a given area where there is demand. The second is dockless. Much like ShareNow (formerly known as car2go), this model allows users to drop off bicycles anywhere within the service area and not simply at a dock. This second model often leads to complaints of bicycles blocking sidewalks, though it also means greater flexibility for users and much less physical infrastructure to maintain.

Docked systems almost exclusively use bicycles. These may be electric-assist, which makes hills easier to navigate, or entirely manual. Dockless systems, in the DC region, consist either of electric-assist bikes or electric scooters.

Electric scooters are a new mode entirely. Often capped at 10 or 15 miles per hour, they allow people who may not feel comfortable on a bicycle for sartorial, meteorological, or physical reasons, to easily travel around a city with some speed. Unfortunately, users often ignore directives to stay off sidewalks because they do not feel safe mixing with general traffic. They also tend to weave on and off the sidewalk into the roadway as they encounter obstacles or hazards in one realm or the other. As a result of their speed, pedestrians do not feel safe sharing space with scooter users (because users are moving too fast relative to walking speed) and drivers get impatient if users mix with traffic (because users are also moving too slow relative to driving speed). Finally, though significant portions of the public realm are already dedicated to the storage of private automobiles – which are privately-owned dockless vehicles – there is also often criticism of the use of public space for electric scooter storage.

Both electric scooters and bike share lower the barrier to entry for people who want to ride a bike or get around faster than a car but either want the flexibility of making just one-way trips or who don't own a bike themselves. This can help build a more inclusive and open bicycle culture by encouraging casual users. It can also lower VMT by encouraging people to take a bike or scooter rather than drive to a destination that is too far to walk.

To that end, the City might investigate launching pilot programs of electric scooters and/or bike sharing. If the City so chooses, consideration should be given to enacting legislation covering scooter users and providers, including setting appropriate speed caps to ensure scooters integrate well with pedestrian, bicycle and automobile traffic. Other municipalities have encountered significant operational and political challenges with scooters. Current programs in place across the country would need to be researched for best practices and lessons learned.

Transportation Network Companies

App-based ride-hailing services have revolutionized transportation across the United States. Known as transportation network companies, or TNCs, they have disrupted the long-entrenched taxi industry, pushing many companies out of business while also opening up vast areas to service that never had it before. As of the drafting of this Plan, however, these TNCs operate at a significant financial loss. One company, Uber, lost \$1.3 billion in the second quarter of 2019, excluding one-time costs. Its closest rival, Lyft, lost \$644.2 million in the same time period. It is outside the scope of this Plan to guess whether these losses are temporary or what form a profitable and therefore sustainable TNC might take.

While large cities like San Francisco have seen traffic increase due to TNCs, Frederick is too small to see much increase in traffic. Instead, TNCs have allowed people to access nightlife without worrying about driving and have freed people to leave their car at home.

The City should explore working with the county to determine if TNCs are a viable supplement or alternative to traditional paratransit, given the flexibility of hours may result in cost savings and improved service to those who rely on door-to-door transit service.

Bus Rapid Transit

Bus rapid transit, or BRT, is a suite of transportation improvements that dramatically improves the speed of buses. At the most dramatic, buses have their own lanes separated from traffic; rail-like stations; and off-board fare collection, similar to a light rail line. In Maryland, there is discussion of BRT operating within express lanes on a widened I-270. While this would not give buses their own lane, it would allow them to bypass traffic, have exclusive exits to serve bus stops, and would have dedicated stations and the attendant operating improvements. The Corridor Cities Transitway would also have aspects of BRT.

BRT is a difficult mode to implement effectively. Certain aspects of BRT may be omitted to save costs – for instance, allowing private vehicles to share the bus-only lane – hobbling speeds and therefore ridership on the BRT line. While a bus-only lane can accommodate the same number of people as 5 car lanes, buses coming only ever minute or two creates the illusion of poor use to drivers stuck in traffic next to it, a phenomenon known as lane envy. Other bus-only infrastructure in the region, such as the Shirley Highway Busway and downtown DC's original bus-only lanes, were abandoned due to pressure from drivers.

As the Corridor Cities Transitway and I-270 BRT projects proceed, the City ought to consider how to accommodate bus-only lanes through its streets, especially along East Street, to allow for easy and fast access to the Transit Center and Downtown Frederick.

Express Toll Lanes

Express toll lanes (ETL) allow drivers to either have a carpool or pay a toll to bypass traffic congestion, with the toll being raised or lowered depending on the time of day and the road volume. These toll lanes are currently being considered for I-270 and I-495. In Virginia, I-66 operates as an exclusively ETL highway. According to federal guidelines, these toll lanes must allow for 45 miles per hour of travel if they are on a federal highway. This allows for the lanes to operate close to peak efficiency, usually around 35 and 45 miles per hour, thereby moving far more vehicles per hour than slower, congested lanes.

New ETLs allow drivers to bypass congestion but, similar to public transit, cannot solve congestion due to the fundamental law of traffic congestion. This law, discussed earlier in this chapter, which holds that congestion is homeostatic and will fill the space given, and so for every minute society saves by using the toll lane it loses somewhere else in the system, usually on parallel or feeder roads. If existing lanes are converted to ETLs without adding new capacity, as with I-66, this allows the highway to move more traffic within the same space, reducing overall traffic by only using the old capacity as efficiently as possible rather than adding new capacity.

As the State moves forward with ETL plans along I-270, the City should consider how it will accommodate added traffic demand to access or egress the lanes from US 15 and I-70.

Connected and Autonomous Vehicles

Few transportation issues have garnered as much hype as the integration of artificial intelligence (AI) with cars and trucks. While self-driving trains have existed for decades as airport shuttles (as at Dulles International Airport) and mass transit systems (including, until 2009, DC's Metrorail, whose drivers merely monitored the system and operated the doors), it is the opportunity to bring self-driving vehicles to our roads that seems to most excite the public imagination.

Unfortunately, connected and autonomous vehicles, or CAVs, have taken longer to develop than expected. The urban road environment is incredibly complex, with drivers relying on visual cues ranging from signage to a wave of a pedestrian's hand to a fellow driver's gaze. There are cultural issues as well, with some places allowing rolling stops, others allowing a left-turning driver to go ahead of oncoming traffic after a light change, and so on. Even on limited-access highways, drivers can see how someone might be trying to nudge into the adjacent lane and know to let them go ahead before merging themselves. Translating these minute and idiosyncratic signals into a self-driving car is a monumental task.

CAVs can offer significant benefits over traditional vehicles. Even at partial automation, they can automatically brake or take other defensive action if the vehicle senses danger. As full automation takes over the broader vehicle fleet, CAVs will be able to "platoon" along freeways, reducing stopping distance and potentially tripling the number of vehicles a freeway lane can accommodate per hour. While still nowhere near the capacity of a bus lane, dedicating a lane specifically to CAVs would maximize this potential, encourage CAV adoption, and may allow for better use of land than general-purpose freeway lanes.

Another benefit is door-to-door drop-offs, with the vehicle driving itself to a remote parking location, which will reduce demand for downtown on-street and close-in garage parking.

CAVs also pose significant challenges. They may increase the amount people drive – raising VMT – by reducing some of the mental load of driving and allowing people to do other things while traveling. They may also significantly clog roads. In congested cities, TNCs already cause congestion by circling for passengers, reducing the number of travelers per vehicle to less than 1, compared to 1.6 today. And the solution to the difficulty of programming AI to read hand signals and pedestrians may be to simply limit non-driver access to streets. These drawbacks will increase demand for surface road space even as platooning decreases demand for freeway space.

Given that the earliest estimate for a rollout of a fully autonomous passenger vehicle is somewhere around 2030 with widespread adoption only coming about around 2040, the City has time to see what problems and benefits arise in larger cities. Frederick must be open to new technology but should also keep in mind that the strength of the City's economy rests on a strong, walkable downtown. As well, the safety and accessibility of City streets for all users, whether in a CAV or not, must be the paramount concern. Alongside the importance of safety, downtown vibrancy must also be accounted for when considering regulations for CAVs and whether to allow testing in City limits.

Unmanned Aerial Vehicles, Drones, and Other Next-Generation Technologies

Perhaps even more so than CAVs, unmanned aerial vehicles (UAVs) and surface drones are experimental technologies. Both have a variety of uses, with UAVs envisioned for passenger service and both UAVs and drones envisioned for package delivery and other small freight. Neither are currently in operation.

UAVs for passenger service should be treated similarly to helicopters, with tight regulations on use. Given that estimates of passenger load are relatively low, they will likely remain a niche use for major transportation, with potential uses as ambulances or airport shuttles. The square footage required for parking is also quite high, and it is simply not possible to move significant numbers of people using the technology.

As freight, the City should remain cautious. Regarding UAVs, noise, privacy, airport interference, and public safety are all issues that need to be addressed. Surface drone delivery may also prove problematic given the City's narrow sidewalks, as drones would need to share space with pedestrians. Given limited resources, the City may wish to opt out of testing for package delivery unless a truly compelling case is made by the company doing the testing.

EQUITABLE ACCESS TO THE CITY

In 2018, according to the US Census, approximately 1 in 8 Frederick households had fewer vehicles available than workers, and 1 in 20 had no vehicle available at all. This may hide the number of people who need a vehicle but find it to be a strain on an already-tight budget. Between maintenance, car payments, gas, depreciation, and insurance, a car can cost more than \$8,000 per year according to AAA. A used car might be cheaper but will still cost thousands of dollars per year.

Even for those who could afford a vehicle, many cannot drive due to visual impairments and other disabilities, such as vulnerability to seizures. Friends, transit, taxicabs, and transportation network companies (TNCs) like Uber and

Lyft provide some mobility, but these options are either burdensome or more expensive than driving and are not equivalent to the freedom of movement given to private vehicle drivers.

Incomplete bicycle and walking networks alongside low-density land-use and low-quality transit means car ownership is the only way to fully participate in City life. Those who cannot drive or own a car in such a situation must rely on the alternatives described above to provide rides to and from events, jobs, shopping, education, and even civic participation. City residents should never feel left behind or disconnected from the rest of their community because of transportation problems.

This plan must therefore be implemented with special care for those who rely on means of travel other than driving, and special attention should be made to reach out to communities where driving is a lesser option. Some ways to incorporate equity into the City's planning practices are:

1. Coordinate with community groups active in low-income and minority communities for public outreach on transportation-related matters.
2. Conduct grassroots outreach in neighborhoods and in formats that cater to populations that may not be able to attend meetings or may feel uncomfortable in traditional public feedback settings.
3. Ensure neighborhood vehicle ownership rates and income are considered when modelling and prioritizing transportation spending.

Issues specific to transit service are described earlier in this chapter under the "Transit" header.



AIRPORT

The Frederick Municipal Airport (FDK) plays an important role in providing general aviation capacity relief for the heavily congested airspace in the Washington-Baltimore region. Frederick's airport supports the Baltimore-Washington International airport by offering general aviation pilots with an alternative to the use of scheduled service airports. FDK is the preferred executive airport in the National Capital Region and, with more than 90,000 aircraft operations annually, is Maryland's second-busiest airport behind BWI. FDK is host to 203 aircraft, 9 businesses, and 150 jobs. Additionally, it is important to note that FDK is the headquarters of The Aircraft Owners and Pilots Association (AOPA), the world's most influential general aviation organization.

The airport serves our community in several ways: the Maryland State Police Trooper 3 helicopter unit is based at FDK providing rapid access to law enforcement, search and rescue, and medivac services. Aerial mapping, on-demand air charter, organ and medical transplant, and advanced flight training are resources readily available to the community. Businesses heavily rely on unscheduled aircraft transportation to remain competitive and a fully developed multi-modal transportation network is often a key component when selecting a business location.

Since the adoption of the 2010 Comprehensive Plan, many improvements have occurred to make the Airport more efficient. These include the construction of the air traffic control tower, a 600' extension to runway 5, the construction of the snow removal equipment building, and the grading and preparation for future addition of multiple hangars to increase FDK's capacity.

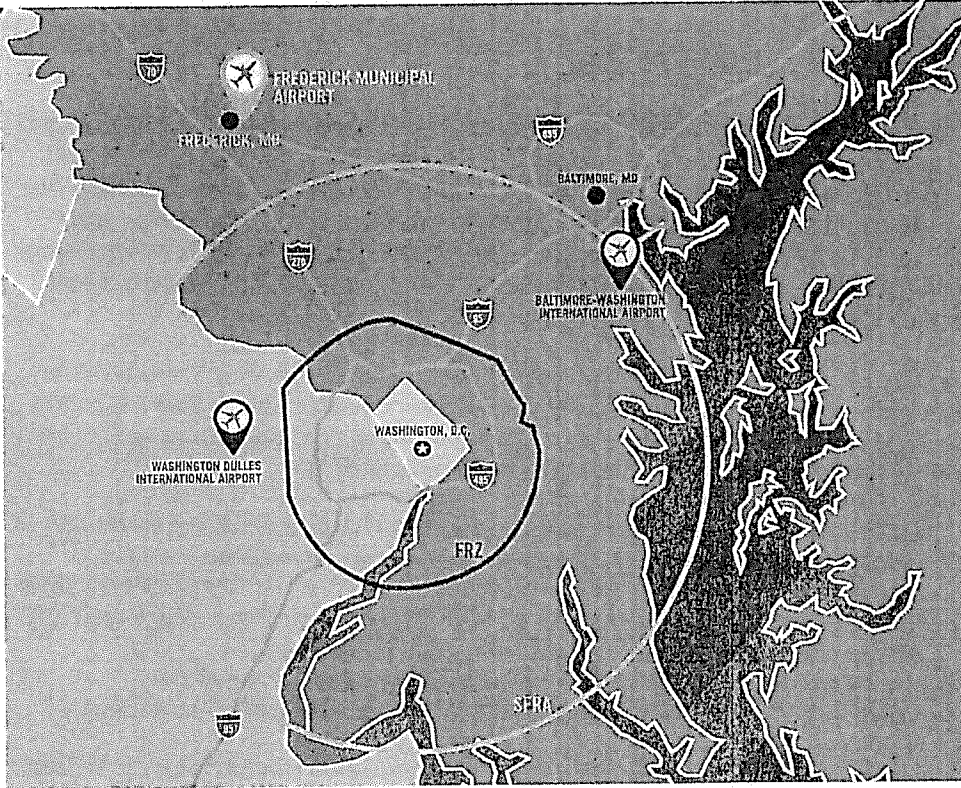


Figure 3-5: Frederick Municipal Airport Regional Map

Source:
Department of
Economic Development

This plan addresses the types of land use and road improvements that need to occur to accommodate future expansion and continue the airport's status as a reliever airport within the region. Accordingly, future expansions at and adjacent to the airport should be coordinated with the Airport Master Plan in order to provide proper guidance for land use and future capital projects. The City must collaborate with the County to ensure that the growth of the surrounding lands allows for expansion of the airport to meet the region's economic development needs

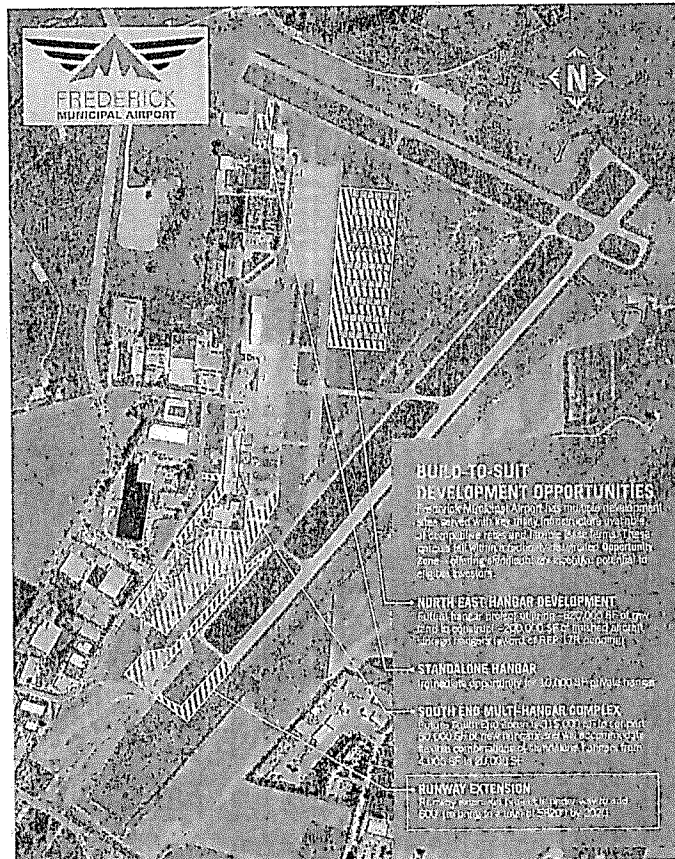


Figure 3-6: Build-to-Suit Development Opportunities

Source:
Department of
Economic Development



FUNDING SOURCES

Obtaining funding is one of the most challenging aspects of providing transportation improvements. Major transportation improvements rely heavily on federal and state dollars to implement. Ensuring City priorities are aligned with the funding programs available poses significant difficulties, especially in the realm of bicycle, pedestrian, and transit improvements.

Policies in this chapter identify not only transportation needs for future years but also the need for the City to consider other potential funding tools. Grants, additional funding sources, and cost-sharing will be needed in order to implement transportation improvements associated with new development, or improvements built in partnership with various municipalities and regional transportation agencies.

Traditional sources of transportation financing include the City's General Fund, highway user fees, grant funds, and developer contributions. However, adjacent jurisdictions often compete for the same external funding sources and so may limit the amount of funding available for a project.

The ability of a finance program to generate the needed revenue for a project is a key measure of its success. Thus, what is needed is a stable stream of revenue that remains constant over time. Currently, the limited availability of a constant revenue source limits the City's ability to plan for and maintain transportation projects. The traditional sources of revenue listed above can fluctuate unpredictably. The reverse can also be true: periods of excess revenue may result in the funding of projects that are not related to long-range transportation efforts due to political pressure. The introduction of a stable revenue source would be beneficial in completing transportation projects.

The City also works to leverage federal and state grant funding to improve infrastructure, using a combination of matching funds, existing regional grant programs, and searching out how multiple projects can be bundled into comprehensive road improvements, with, for example, water infrastructure, sidewalk construction, repaving, and restriping all occurring simultaneously.

MOBILITY FEE

Most jurisdictions nationwide require new development applications to conduct a transportation impact analysis or study that quantifies the additional travel demand expected to be generated by the proposed development and to give recommendations on how to alleviate any adverse impacts caused by that new travel demand. This approach was designed for and generally applies to greenfield development, but in urban areas the conventional traffic study approach often results in recommendations that are impractical due to right-of-way constraints or undesirable due to auto-centric design in urban contexts where multimodal needs are paramount.

Therefore, jurisdictions are considering alternative approaches to assess traffic impact in urban areas, selecting a pro-rata share district approach to development application reviews. In this approach, mobility needs are considered districtwide and the responsibility for private sector involvement is defined based on proportional contributions to address districtwide needs.

rather than needs directly associated with a particular application. Often, the private sector responsibility in this case takes the form of an applicant payment. The term "mobility fee" is an emerging term-of-art that describes this type of pro-rata share district.

In simplest terms, pro-rata share districts assess development application impacts according to a three-step formula expressed as:

$$\text{MOBILITY FEE} = (A/B) \times C$$

where:

A is the cost of transportation system improvements needed to accommodate the demand generated by expected land development,

B is a measure of the demand generated by that expected land development, and

C is a policy decision regarding the balance of private-sector and public-sector responsibility in providing the improvements in item A.



This basic pro-rata share formula is quite simple, but the details of components A, B, and C vary substantially from place to place and will be developed through a public process that considers the interests of all stakeholders.

As part of comprehensive amendments to the City's Adequate Public Facilities Ordinance (APFO), the Mayor and Board of Alderman have directed City staff to pursue a mobility fee approach with a goal of establishing one or more Mobility Fee Districts.

REGIONAL COLLABORATION

The City of Frederick is proud of the wide variety of collaborative efforts underway within the region. The City's membership in the Metropolitan Washington Council of Governments (MWCOCG) provides access to federal transportation funding. Other federal efforts to work toward mutual infrastructure goals include the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). On a state level, collaborative partners include the Maryland Department of Transportation (MDOT), which operates the State Highway Administration (SHA), the Maryland Aviation Administration (MAA) and the Maryland Transit Administration (MTA), which in turn operates the Maryland Area Rail Commuter (MARC) train service and



MTA Bus Service. Finally, at a local level, the City also partners with groups like the Chamber Transportation Advisory Committee and the Transit Services Advisory Council regarding future transportation needs.

As detailed in a prior section of this chapter, Frederick's transportation system is not limited to the City and County network. Accordingly, several policies in this chapter address Frederick as part of the larger transportation network of the Baltimore-Washington metropolitan region. Frederick's position in the region represents another potential hurdle: the need to coordinate the City's land-use and transportation planning within a regional context.

The policies in this chapter that address regional collaboration focus on the creation of a more organized policy structure that includes routine coordination with regional transportation agencies. This type of intergovernmental collaboration would assist in creating a unified vision for linking land-use and transportation decisions among the region's communities with the goal of providing the following transportation elements:

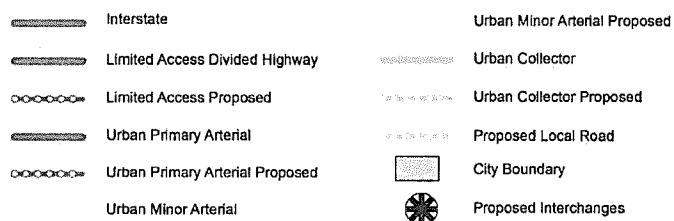
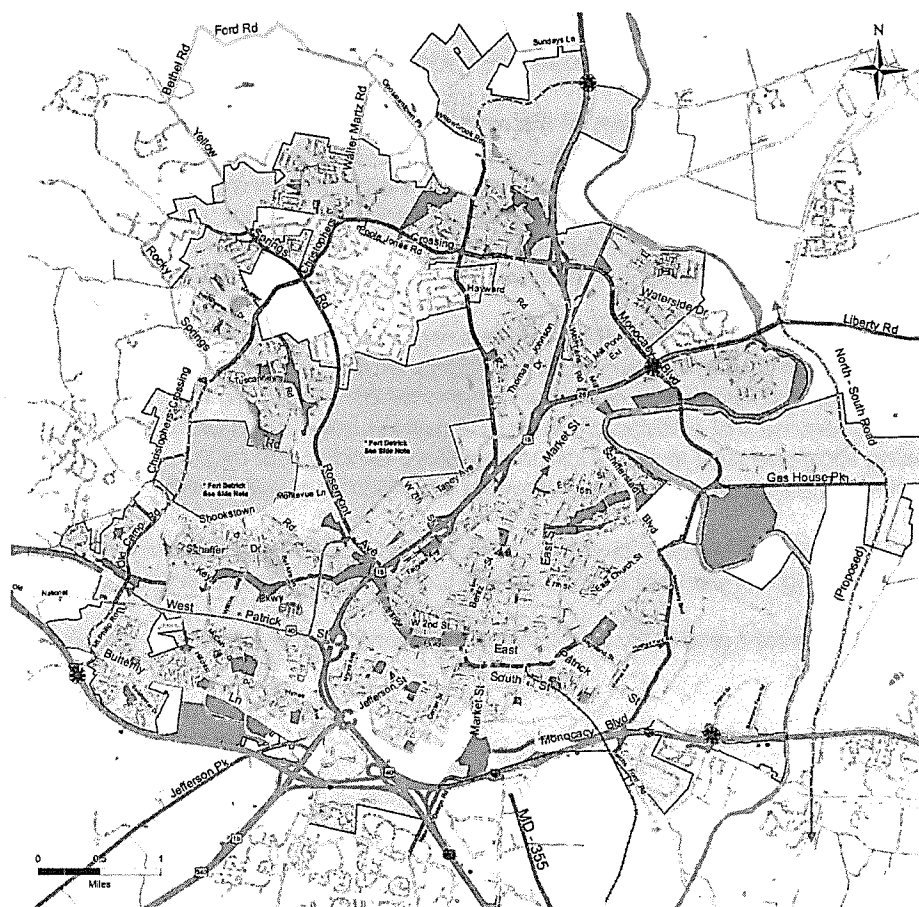
- Complete networks of walking, bicycling, and driving infrastructure allowing convenient access to the County and broader region.
- Convenient and easy public transit systems from Frederick to regional centers.

Figure 3-7: 2040
Roadway Classification

Note:

To show an alternative alignment for Christopher's Crossing that does not cross Fort Detrick property, Kemp Lane and a segment of Shookstown Road have been reclassified to be Urban Primary Arterial. If the alignment through Fort Detrick is maintained, these classifications will be reassessed.

* FORT DETRICK
To show an alternative alignment for Christopher's Crossing that does not cross Fort Detrick property, Kemp Lane and a segment of Shookstown Road are shown as potentially reclassified to Urban Primary Arterial. If the alignment through Fort Detrick is maintained, these classifications would be reassessed.





TRANSPORTATION POLICIES

FOR MORE INFORMATION ON THE POLICIES, IMPLEMENTATIONS, PRIORITIES, AND RESPONSIBLE PARTIES, PLEASE SEE "IMPLEMENTATION CHAPTER".

TR POLICY 1

Apply this Comprehensive Plan and the proposed Future Land Use map to coordinate the phasing of development with needed transportation capacity and improvements.

TR POLICY 2

Maintain an appropriate balance between public and private sector responsibilities for transportation investments and improvements.

TR POLICY 3

Reduce per-capita vehicle miles traveled (VMT) in the City.

TR POLICY 4

Promote bicycle mobility and construct a dense and complete bicycle network consistent with All Ages & Abilities contextual guidance.

TR POLICY 5

Create and maintain a fully accessible pedestrian network throughout the City.

TR POLICY 6

Direct the flow of freight traffic to those facilities that are most suitable and away from other routes and areas where commercial truck traffic is incompatible with adjacent land uses or may cause safety issues.

TR POLICY 7

Preserve and enhance the historic street grid system.

TR POLICY 8

Ensure that any new transportation improvement does not adversely impact the City's neighborhoods.

TR POLICY 9

Prioritize safety and Complete Streets elements in the design and capacity standards for all roadways.

TR POLICY 10

Support enhanced regional public transportation options.

TR POLICY 11

Support airport development in accordance with the approved Airport Layout Plan (ALP) and ensure policies of the Comprehensive Plan are compatible with the efforts to update the ALP in 2020.

TR POLICY 12

Preserve and enhance transportation capacity and multi-modal travel on local, collector and arterial routes that serve the City of Frederick.

TR POLICY 13

Collaborate with MDOT, Frederick County, MWCOG/TPB, TSAC, and CTAC to develop joint and complementary transportation planning programs.

TR POLICY 14

Maintain the City parking system's balance between supply, demand, customer service, and financial self-sufficiency.

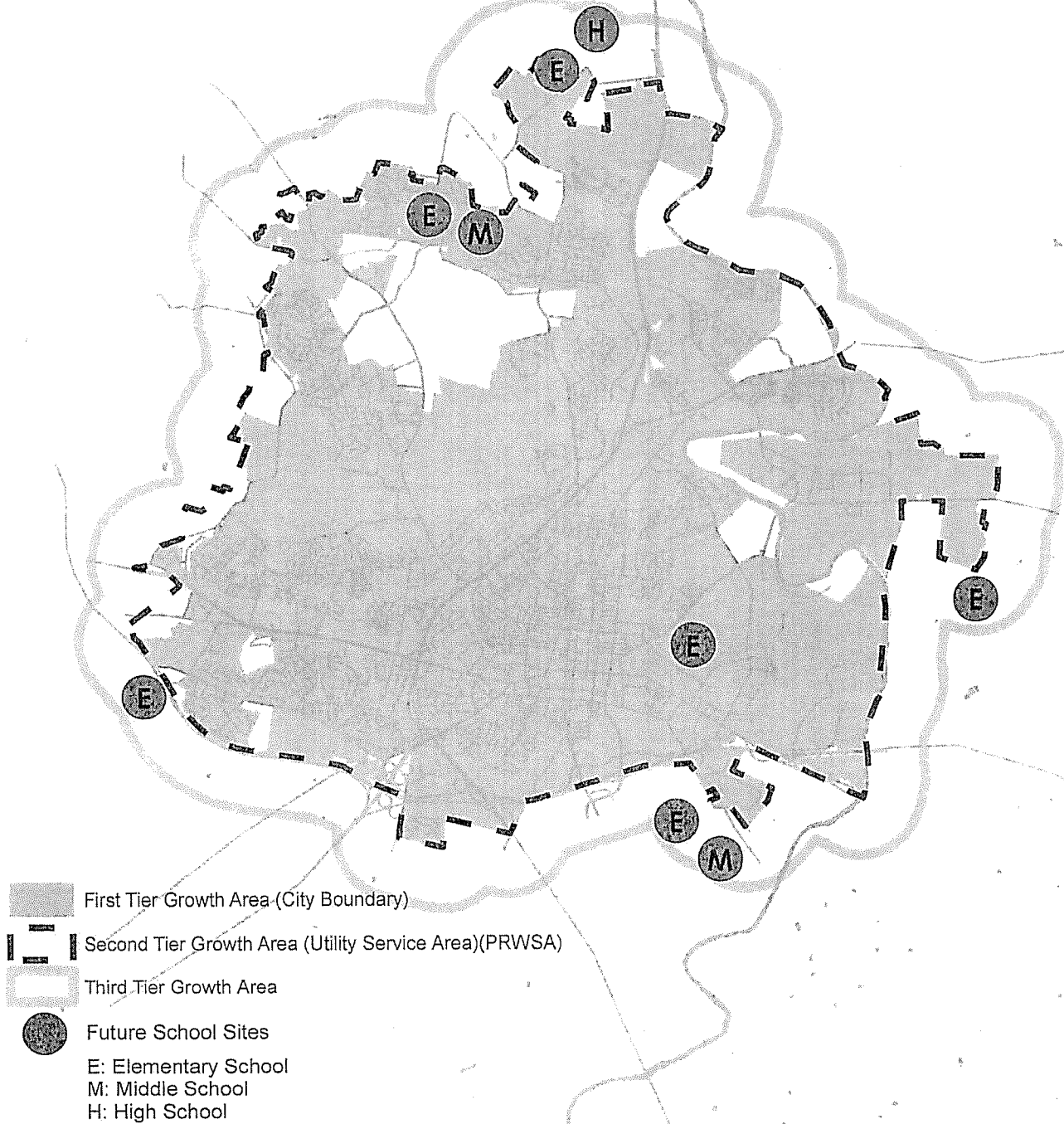
TR POLICY 15

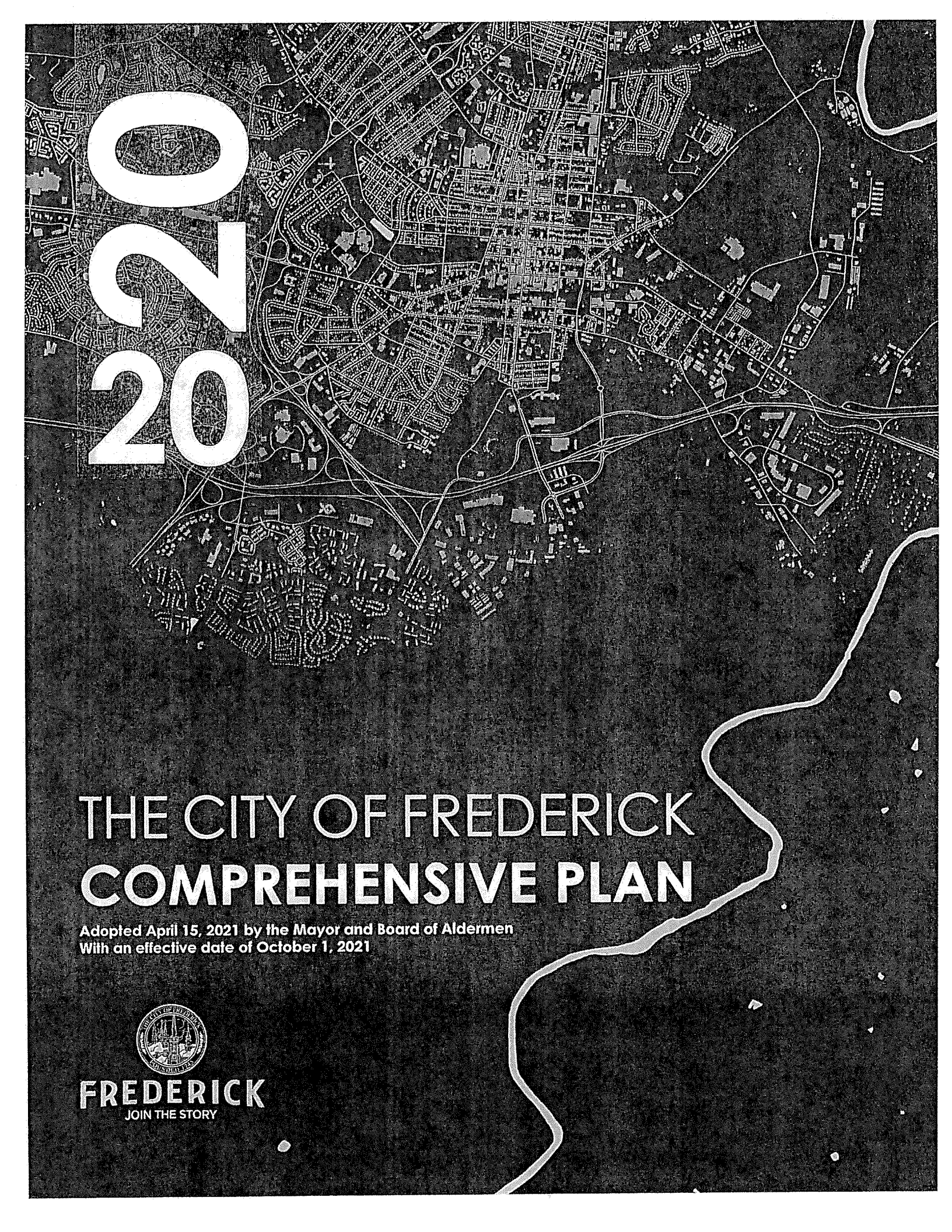
Actively engage underrepresented communities and low-income residents into transportation decision-making processes.

TR POLICY 16

Advocate for safe and effective traffic mitigation improvements to the I-270 and I-70 corridors.

Frederick County Public Schools: Future School Sites





ON 20

THE CITY OF FREDERICK COMPREHENSIVE PLAN

Adopted April 15, 2021 by the Mayor and Board of Aldermen
With an effective date of October 1, 2021



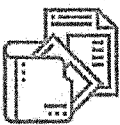
FREDERICK
JOIN THE STORY



QUALITY OF LIFE AND SUSTAINABILITY
PUBLIC PARTICIPATION
GROWTH AREAS
COMMUNITY DESIGN
INFRASTRUCTURE
TRANSPORTATION
HOUSING
ECONOMIC DEVELOPMENT
ENVIRONMENTAL PROTECTION
RESOURCE CONSERVATION
STEWARDSHIP
IMPLEMENTATION

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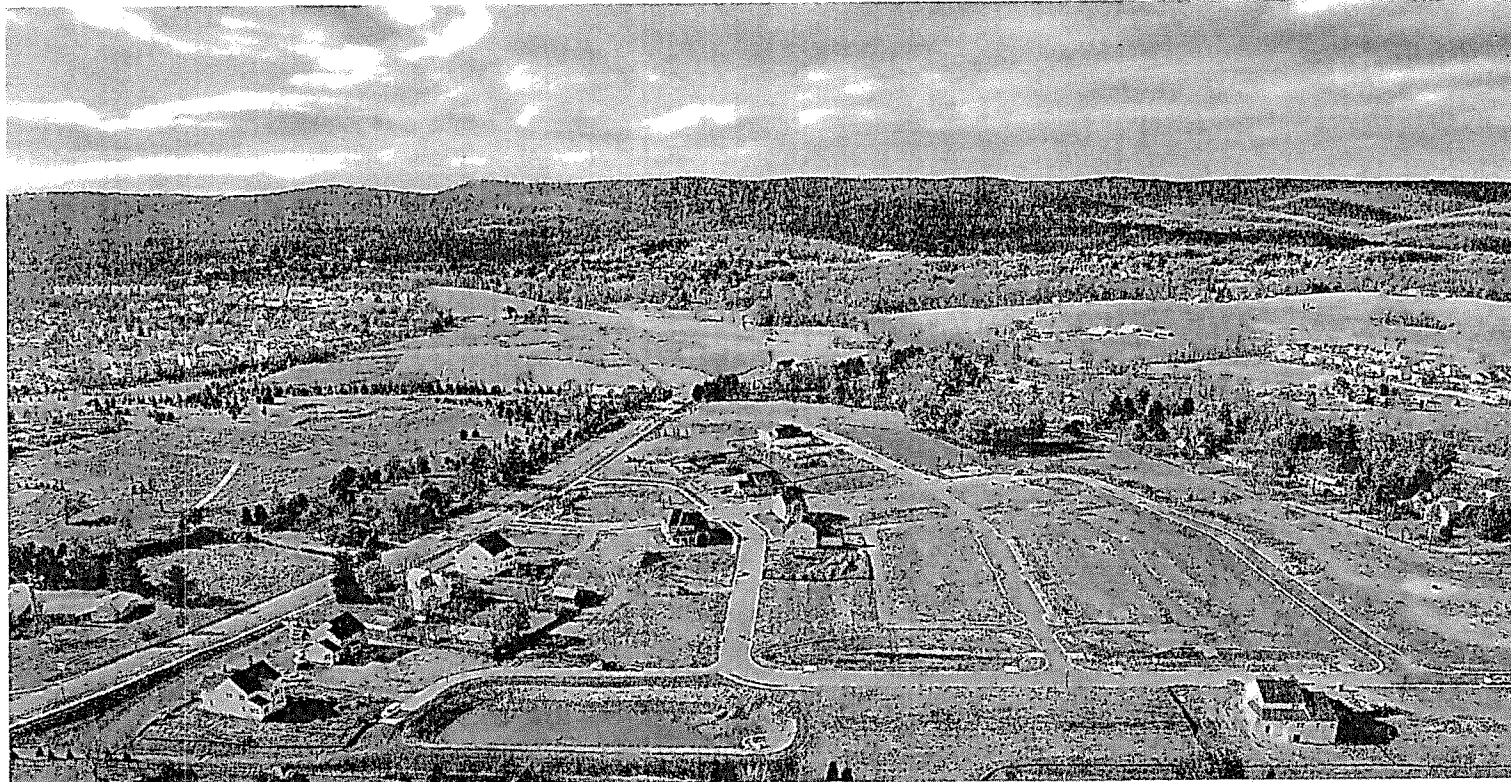
MUNICIPAL GROWTH



OVERVIEW

The purpose of this chapter is to examine the relationship between land use and population trends to predict the residential and non-residential demand as well as their impacts on public services and community facilities. In combination with other chapters of this Plan, recommendations to guide growth, infrastructure, and services both within and outside of the existing City boundary are examined. These policies also affect State assistance as the analysis of capacity available for development, including infill and redevelopment, play a significant role in the creation of The City of Frederick Priority Funding Area (PFA).

As stated in previous chapters, the City is expecting a continual increase in population, which will have a significant impact on development patterns and land consumption as well as the City's service boundary. An overarching goal of the Comprehensive Plan is to prioritize redevelopment of vacant



Source: Kellerton Community; Keystone Custom Homes

PRIORITY FUNDING AREAS:

PFA'S ARE EXISTING COMMUNITIES AND PLACES DESIGNATED BY LOCAL GOVERNMENTS INDICATING WHERE THEY WANT STATE INVESTMENT TO SUPPORT FUTURE GROWTH.



and underutilized lands and buildings, where existing infrastructure and public services have the capacity to serve the additional growth. The 2010 Comprehensive Plan recommended a modest expansion of the City limits in comparison to the 2004 Comprehensive Plan and the subsequent annexation initiative. Unlike the 2010 Plan, this Plan does not limit the extent of future growth outside of the existing corporate boundary. Instead a flexible growth approach acknowledges that a healthy balance between market demand and infrastructure constraints will determine the future growth pattern.

In recent history, the City's growth boundary has been limited by water capacity, mainly determined by the City and County Potomac River Water Service Agreement (PRWSA), a utility service agreement for County supplied water capacity. In addition, the school capacity has been a factor for new development, including infill and redevelopment opportunities. When considering the population projection coupled with the limitations of utility capacity and school capacity, it is important to remain flexible to emerging technologies and governmental policies that may affect the growth patterns that the market demands.



POPULATION GROWTH

The City of Frederick showed the largest percentage of growth in the following years: 1860 (35%), 1930 (30%), 1990 (43%) and 2000 (31%). The City of Frederick only had one period of decline and that happened in 1890. The reduction in population amounted to five percent (5%) of the total population.

The 1860's increase can be attributed to Maryland's predominant role of being the breadbasket of the Mid-Atlantic region. The rail had been expanded to the region as well as the C&O Canal to help reduce the cost of transporting goods from the region to Baltimore.

The 1930's increase can be ascribed to focus on the air cargo transport and the military where Detrick Field, now Fort Detrick, was used as a summer training camp by the 104th Air Squadron 29th Division. Again, like the railroad had been in the previous era, air cargo transport had been expanded to the region and the labor associated with this economic growth. Detrick Field became Camp Detrick and continually grew through the 60's. The exception was the 1970's when both the City and the County entered into a prolonged and difficult economic downturn.

Almost half of the City's population growth occurred after 1980. This unprecedented growth is related to the growth at Fort Detrick and the price of real estate. In 1990 and 2000 due to the rising cost of land around Washington DC and Baltimore, the City of Frederick was viewed as an acceptable commuting distance to these two large employment areas.

In the last 10 years, the City of Frederick and Frederick County has seen a rise of employers relocating to the area. Table 4-1 shows the businesses that were either relocating or expanding in the City. Frederick's City population has been about 24.5% of Frederick County's population in 1980 and has increased to 28% in 2010. According to Metropolitan Washington Council of Governments (MWCOC), this ratio is not expected to change significantly until 2040. Table 4-2 shows this relationship.

Table 4-1: Major Business Relocations and Expansions Since 2010

Source: COF's Economic Development Department

NEW BUSINESSES

Fort Detrick National Biodefense Campus – Biomedical Research and Development
Frederick Innovative Technology Center Inc (FITCI) @ ROOT – Technology Business Incubator
Frederick National Laboratory for Cancer Research – Biomedical Cancer and AIDS Research
Ogden Newspapers Printing (formerly Randall Family LLC)
Wilcoxon Sensing Technologies – Manufacturing

BUSINESSES WITH EXPANSIONS

AstraZeneca (formerly MedImmune) – Biopharmaceutical Manufacturing
Charles River Labs – Vivarium
Dairy Maid Dairy
Equipment Development Corporation (EDCO) – Floor Finishing Manufacturing and custom Metal work
Fort Detrick National Biodefense Campus – Biomedical Research and Development
Frederick Health – Frederick Memorial Hospital
Stulz ATS – HVAC Manufacturing

Table 4-2: City/County Population and Housing Ratio

Source: US Census / MWCOC

		1980	1990	2000	2010	2020	2030	2040
		CENSUS	CENSUS	CENSUS	CENSUS	COG'S ESTIMATE	COG'S ESTIMATE	COG'S ESTIMATE
City of	Population	28,086	40,148	52,767	65,239	79,400	89,600	92,800
Frederick	Housing	10,647	15,671	22,106	27,559	30,900	35,200	36,600
Frederick	Population	114,792	150,208	195,277	233,385	267,800	303,600	332,200
County	Housing	39,671	54,872	73,017	90,136	99,000	115,100	126,500
City/County	Population	24.5%	26.7%	27.0%	28.0%	29.6%	29.5%	27.9%
Ratio	Housing	26.8%	28.6%	30.3%	30.6%	31.2%	30.6%	28.9%

FUTURE POPULATION GROWTH

The City of Frederick is under intense growth pressure due to its relative location of being 45 miles from both Baltimore, Maryland and Washington, DC, as well as its northern location within the 1-270 jobs corridor. The City's population growth trend is expected to continue as MWCOG projects more than 32% population increase from 2015 to 2045 for the City.

2015 TO 2045 GROWTH										
JURISDICTION	2015	2020	2025	2030	2035	2040	2045	Number	% Change	Share
CITY OF FREDERICK	70.4	79.4	87.0	89.6	91.1	92.8	93.1	22.7	32.2%	1.5%
FREDERICK COUNTY	246.5	267.8	288.7	303.6	319.4	332.2	344.1	97.6	39.6%	6.4%
DISTRICT OF COLUMBIA	672.2	729.5	787.1	842.2	893.9	940.7	987.2	315.0	46.9%	20.5%
MD JURISDICTIONS	2317.0	2410.0	2492.2	2580.0	2662.4	2730.6	2799.8	482.9	20.8%	31.5%
VA JURISDICTIONS	2401.3	2550.6	2697.1	2826.9	2940.6	3041.5	3138.6	737.3	30.7%	48.0%
COG REGION	5390.6	5690.0	5976.4	6249.0	6497.0	6712.8	6925.7	1535.1	28.5%	100.0%

Table 4-3: Summary of Intermediate Population Forecasts (Thousands)

Source: MWCOG's Round 9.1 Growth Trends to 2045

2015 TO 2045 GROWTH										
JURISDICTION	2015	2020	2025	2030	2035	2040	2045	Number	% Change	Share
CITY OF FREDERICK	27.3	30.9	34.1	35.2	35.9	36.6	36.7	9.5	34.8%	1.5%
FREDERICK COUNTY	89.5	99.0	107.9	115.1	121.1	126.5	131.2	41.7	46.6%	6.4%
DISTRICT OF COLUMBIA	297.1	319.3	341.0	362.5	380.6	396.2	411.9	114.8	38.6%	17.7%
MD JURISDICTIONS	839.1	884.7	923.0	965.8	1001.1	1030.9	1062.0	222.9	26.6%	34.4%
VA JURISDICTIONS	875.5	929.1	990.7	1046.3	1095.1	1138.3	1186.0	310.5	35.5%	47.9%
COG REGION	2011.7	2133.1	2254.7	2374.6	2476.8	2565.4	2659.9	648.2	32.2%	100.0%

Table 4-4: Summary of Intermediate Household Forecasts (Thousands)

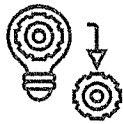
Source: MWCOG's Round 9.1 Growth Trends to 2045

Decennial Census		State of Maryland	Frederick County	Frederick City	ACS Census		State of Maryland	Frederick County	Frederick City
1950	Total Households	667,522	17,302	5,582	2011	Total Households	2,134,517	87,441	25,507
	Household Size	3.51	3.60	3.25		Household Size	2.67	2.67	2.53
1960	Total Households	863,003	20,092	6,675	2012	Total Households	2,157,717	86,492	26,526
	Household Size	3.48	3.44	3.11		Household Size	2.66	2.72	2.44
1970	Total Households	1,175,073	24,869	7,820	2013	Total Households	2,161,680	88,531	27,125
	Household Size	3.25	3.27	2.86		Household Size	2.68	2.67	2.41
1980	Total Households	1,460,865	37,499	10,647	2014	Total Households	2,165,438	89,084	27,209
	Household Size	2.82	2.97	2.52		Household Size	2.7	2.68	2.45
1990	Total Households	1,748,991	52,570	15,671	2015	Total Households	2,177,934	89,947	27,298
	Household Size	2.67	2.70	2.45		Household Size	2.48	2.67	2.69
2000	Total Households	1,980,859	70,060	20,891	2016	Total Households	2,194,657	89,800	27,035
	Household Size	2.61	2.72	2.42		Household Size	2.52	2.7	2.68
2010	Total Households	2,156,411	84,800	25,352	2017	Total Households	2,207,343	92,329	28,966
	Household Size	2.61	2.70	2.50		Household Size	2.68	2.67	2.4
					2018	Total Households	2,215,935	95,903	28,558
						Household Size	2.66	2.62	2.46

Table 4-5: Historical Household Data (1950-2018)

Source: US Census

According to calculations by COG, in 2045, the City's population will be 93,100 in 36,700 households. This equates to a household size of 2.54 people per household. However, based on the 2018 American Community Survey (ACS), Frederick's household size is currently 2.46 and considering the historical data, it is expected to decrease just like in the past decades. Considering COG population projection of 93,100, coupled with household size decreases to 2.35, there will be a need of just under 40,000 housing units in the City.



FUTURE GROWTH PRIORITIES

A policy recommendation of this plan is to encourage mixed-use redevelopment and infill development with the addition of several mixed-use land classifications and higher densities within the Tier I and Tier II growth boundary. The purpose of these recommendations is to meet the demand for housing as the population increases with limited growth potential outside of the existing growth boundary and PRWSA. At this time there are approximately 790 acres of land within the PRWSA and Tier II growth area that could be annexed and developed.

The land beyond the Tier II growth area that could be annexed is limited due to geographical, topographic and political influences. There is potential for growth to the north and west of the City. However, due to the extreme infrastructure costs, the increased elevation limits the potential to provide water services to those areas. There are areas to the east that may be developable, however the Monocacy River provides a natural geographical boundary, which may be cost prohibitive to provide adequate road infrastructure to serve the neighborhoods. As indicated in the Land Use Chapter, the areas south of Interstate 70 are delineated as future Frederick County growth areas and served by County sewer. While the City would encourage development in this area to be developed within the City boundary, the willingness to annex into the City is unknown.

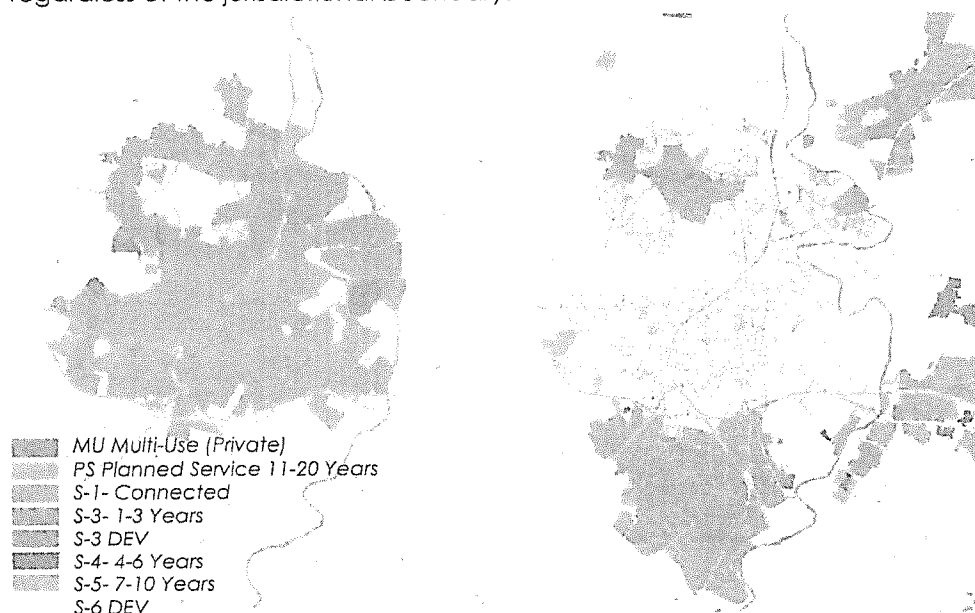
Generally, the City encourages development to occur within the corporate boundary, rather than the periphery, to ensure that new development contribute towards City services and resources that they will impact regardless of the jurisdictional boundary.

Figure 4-1: Sewer Service Areas

Left:
Frederick City Sewer Service Areas

Right:
Future Growth Area Served by County Sewer

Source (data): Frederick County GIS



GROWTH ASSUMPTIONS

The City has historically been the growth center of Frederick County and is projected to continue to attract much of the County's growth and development for the next 10-20 years. The City is anticipated to be the growth center for Frederick County for the following reasons:

- Federal, State, and County infrastructure is concentrated in the City.
- The state of Maryland's Smart Growth policies focuses growth towards areas with infrastructure in place.
- Frederick County's *Livable Frederick Master Plan* includes the City of Frederick within the Central District which is a Primary Growth Sector.
- The City of Frederick is a State Priority Funding Area.



Figure 4-2: Developable areas to the North, South, and East



TOPOGRAPHY AND FUTURE DEVELOPMENT

The City's existing water supply and distribution system is divided into two major pressure zones, with the lower Pressure Zone 462 to the east and higher pressure Zone 595 to the west. The system includes elevated storage tanks to supply water at adequate pressure in these zones.

As the City develops to the north and west, it is important to realize that any development at an elevation higher than Zone 595 will require additional infrastructure to supply the necessary water and pressure to service those demands. As we project development, these areas may require infrastructure such as elevated storage tanks or other methods that may be costly to the developer or City. The map below shows areas that are outside of the City boundary at an elevation higher than 595 that cannot be serviced by existing infrastructure.

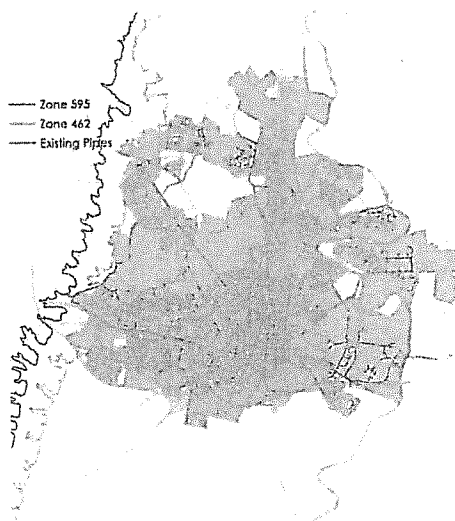


Figure 4-3: Water Supply and Pressure Zones

DEVELOPMENT CAPACITY

In simple terms, the development capacity is the relationship between the projected population growth and resulting housing demand. The purpose of this exercise is to determine if the City has adequate land, zoned appropriately to meet the housing demand as the population grows or if there is a need to extend corporate limits and services to prepare for the predicted growth. Since 2004, the City has considered future growth in the following Tiers:

- Tier I – Areas for Infill and Redevelopment within existing City limits
- Tier II – Immediate areas of growth limited to prescribed water capacity
- Tier III – Areas of future growth without allocated water capacity assumptions

In calculating the land area required by the future growth of the City, this chapter of the comprehensive plan is based on the following assumptions:

TIER I DEVELOPMENT WITHIN THE EXISTING CITY LIMITS

Tier I development consists of the infill and redevelopment of vacant and underutilized parcels within the existing City boundary. For the purpose of projecting growth, only the vacant parcels are considered. The vacant land available for development is approximately 1,550 acres, of which only about 817 acres are zoned residential or mixed use.

Figure 4-4: First Tier Growth Area (City Boundary)



As of the fourth quarter of 2019, there were approximately 7,000 units in the development pipeline. Using conservative trends from 2000-2019, the average number of dwelling units constructed per year is approximately 450. Given the historical pace of residential development, the residential pipeline will be exhausted in 2035.

The number and size of vacant parcels are itemized in Table 4-6. This information demonstrates the development potential of the vacant acreage. As depicted, there are few lots over 25 acres. Medium-sized lots (three to 25 acres) allow for creative development opportunities that have the most potential to add to the unique character of the City. Small lots can be developed by small home builders or consolidated with neighboring parcels to improve single lot development opportunities.

VACANT LAND	TOTAL PARCELS	TOTAL ACRES
0-2.99 Acres	1816	449.716
3-4.99 Acres	51	192.638
5-24.99 Acres	85	818.73
25+ Acres	19	1052.35
All Parcels under \$10,000 of Improvements	1970	2513.434

Table 4-6: Number of Vacant lands by Acreage

ZONING	TOTAL VACANT PARCELS	TOTAL VACANT ACRES	RESIDENTIAL MAXIMUM DENSITY (DU/Acre)	Residential Multiplier	NONRESIDENTIAL MAXIMUM SQUARE FOOTAGE (FAR)	Nonresidential Multiplier	POTENTIAL DWELLING UNITS	POTENTIAL SQUARE FOOTAGE
RO	5	0.771						
R4	410	387.96	4	0.5			776	
R6	113	28.384	6	0.5			85	
R8	56	53.729	8	0.5			215	
R12	69	15.377	12	0.5			92	
R16	10	29.263	16	0.5			234	
R20	0	0	20	0.5			-	
MU	71	227.16	15	0.5	0.3	0.75	1,704	2,226,395
MU2	6	52.746	15	0.5	0.3	0.75	396	516,964
DB	81	11.729	50	0.5			293	
DBO	6	0.678	50	0.5			17	
DR	83	10.567	40	0.5			211	
PB	6	10.316			0.25	0.75		84,256
GC	71	196.74			0.25	0.75		1,606,874
MXE	11	213.23			0.25	0.75		1,741,556
IST	46	26.92			0.25	0.75		219,869
M1	60	132.19			0.25	0.75		1,079,662
M2	11	27.956			0.25	0.75		228,331
MO	8	24.219			0.25	0.75		197,809
NC	5	9.807			0.25	0.75		80,099
PRK	5	18.173						
TOTAL							4,023	7,981,814

Table 4-7: Development Capacity by Zoning Classification

This table assumes the potential residential dwelling units and nonresidential square footage using the maximum by-right development potential. The residential and non-residential multiplier is a staff assumption to provide a more realistic projection based on many unknown constraints that would prevent the maximum build-out.

Infill Capacity Analysis

To estimate the development capacity of the vacant parcels, those of 3 or more acres are assumed to support noteworthy infill development. The applicable zoning classification was matched to the parcel to calculate the expected residential development capacity for each parcel. Selected parcels are shown on Figure 4-5. Results from this parcel by parcel analysis are shown in Table 4-7.

Parcels zoned for commercial or industrial development were not included in this analysis. However, these parcels are shown in Table 4-7, since their future development will place demand on the water, sewer, and road infrastructure. 246 parcels totaling 735 acres zoned Commercial or Industrial were subtracted from the total to isolate those parcels expected to yield residential or mixed-use infill development at build-out within the City's current corporate limits.

Results of the projection indicate that development of these noteworthy parcels could result in more than 4,000 residential units. Utilizing the 2018 calculated household size of 2.46, the development potential of these units has the potential to support almost 10,000 new residents at build-out. When added to the existing population, a total of around 82,000 residents could be supported within the existing City limits.

In addition to vacant parcels' potential for development, there is always a redevelopment possibility for underutilized parcels. Typically, as an existing structure ages over time, maintenance becomes more expensive and

*Figure 4-5: Developable
Vacant Lots in Tier I*



the improvement value declines. Meanwhile, as population and wealth increase, the demand for land tends to rise and so does the value. Although not calculated in this analysis, the ratio for land value to improved value is depicted in Figure 4-6 to determine the probability of the potential redevelopment: as the ratio increases, the likelihood that reinvestment will occur on the land increases.

It is important to note that the expected residential units yielded in this forecast will be inflated because many development constraints are not assumed.



Figure 4-6:
Redevelopment
Potentials of
Underutilized Parcels

Land/Improvement
Value Ratio Analysis

Land/Improvement Value Ratio
1 and above

TIER II DEVELOPMENT BEYOND PRESENT CITY LIMITS

The City's growth will not be limited to areas currently located within the existing corporate limits. Several parcels are located within the Tier II boundary, which includes the PRWSA limits. These parcels are contiguous or proximate of the City's boundary and have the right to petition for annexation at any time.

Areas that represent potential growth through annexation and are located within the Tier II growth area are shown on Figure 4-8 and listed in Table 4-8. The estimated development potential through potential annexation and growth for these parcels is summarized in Exhibit 4 of the PRWSA. Please

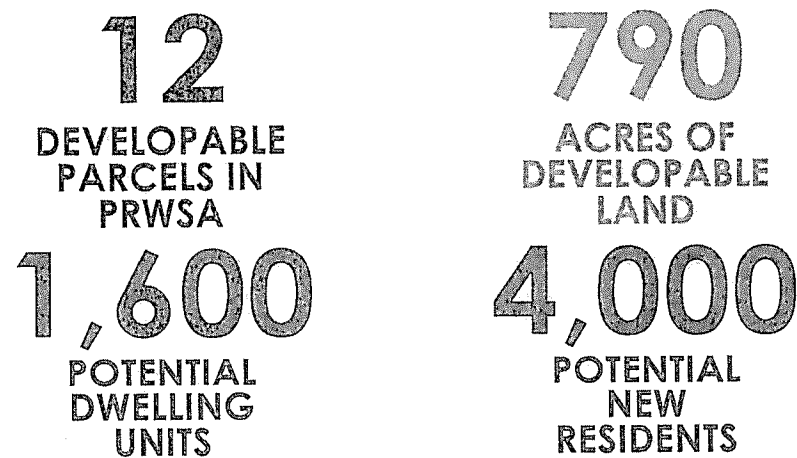


Figure 4-7: Second Tier
Growth Area (Utility
Service Area) (PRWSA)



note that the projection of the PRWSA is estimated and the property will be carefully reviewed at the time of annexation.

Parcels zoned for commercial or industrial development were not included in this analysis. However, they are shown in the table since their future development will place demand on the water, sewer, and road infrastructure. 12 parcels totaling 790 acres zoned for Residential and/or Mixed-use are expected to yield residential units at build-out within the PRWSA limits.

Results of the projection indicate that development of the Tier II parcels could result in more than 1,600 residential units. Utilizing the average household size of 2.46, the development potential of these units has the potential to support almost 4,000 new residents at full build-out. When added to the existing population and projected infill population, a total of 86,000 residents could be supported within the Tier II boundary.

PRWSA Number	Project	Acres	Unit Quantity	Unit Type
3	Richfield Farm Rt 15	141	141	acre
10	Rice	37	111	SF res
17	Hooper	62	186	SF res
17A	Hooper Southwest	62	186	SF res
18	Barrick Crum Ramsburg	77.44	120/53/128	SF/TH/MF
22	Blentinger Road Properties	28	84	SF res
40	Emerald Farms - Humberson	34.83	109	SF res
50	Summer - Adjacent	55	110	SF res
51	Umberger - GHP	125	125	acre
62	Crum Staley - Willowbrook Road	74	LS	mixed
105	Tauraso Annexation	13.5	54	SF res
107	Hooper Annexation	79.68	350	SF & MF
Total		789.45	1616	Residential Units
			340	Acres of Commercial / Mixed Use

Table 4-8: Residential Development Capacity



Figure 4-8: Second Tier Growth Potential Developments

TIER III GROWTH

Growth in this tier is to be considered only after the first two tiers are substantially developed. As described in the Land Use Chapter, the 2020 Comprehensive Plan eliminates the future Tier III growth area from the Land Use Map. It prioritizes infill and redevelopment opportunities within the existing municipal boundary and creates flexibility for future annexations. The flexibility is shown by a hatched area surrounding the Tier II/PRWSA boundary. Unforeseen economic growth opportunities may require additional land for nonresidential land uses and/or housing to supply for a growing workforce.

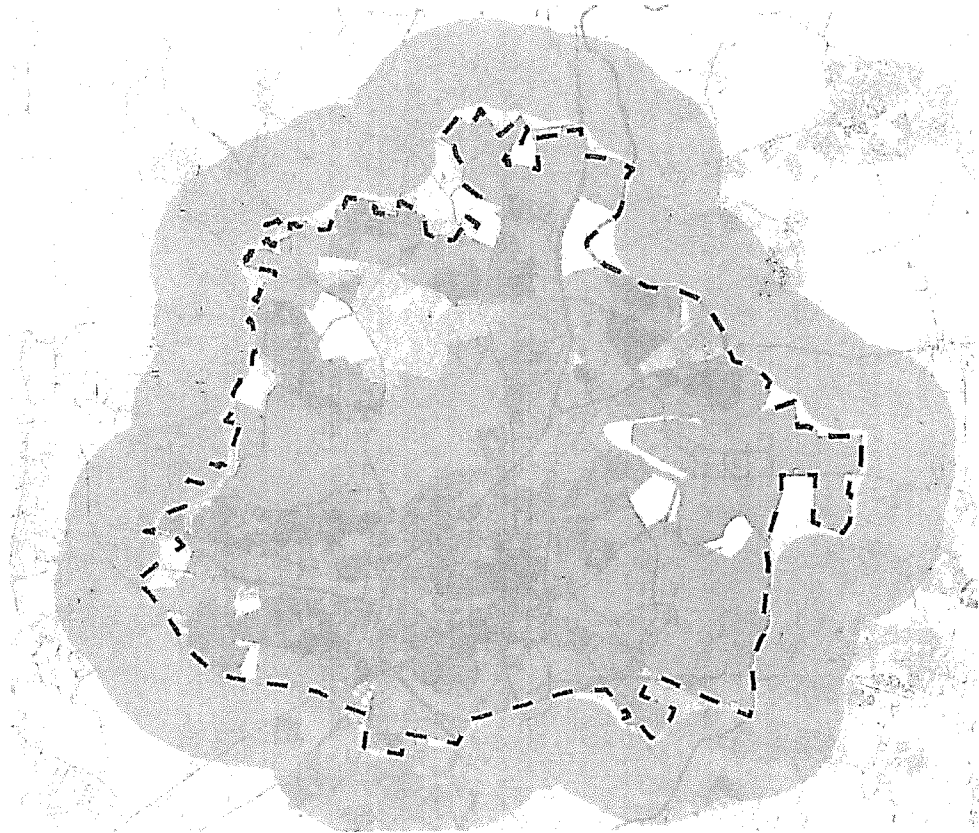
When adding the potential development of the parcels located within Tier I and II with the current pipeline, the planned residential dwelling units can supply a population of 103,000. ($12,600 \times 2.46 + 72,000$)

Please see the Land Use Chapter and Future Land Use Map for further details on the three growth tiers.

Sustaining Growth Projections

The growth projections based on the Tier I & II development areas yield a similar conclusion as the MWCOC projections.

Figure 4-9: Third Tier Growth Area



29,000	7,000	4,000	1,600
EXISTING HOUSING	UNITS IN PIPELINE	TIER I UNIT POTENTIAL	TIER II UNIT POTENTIAL

36,700	<	41,600
HOUSEHOLDS MFCOG PROJECTS FOR 2045		HOUSING UNITS FREDERICK CITY PROVIDES

Additionally, according to MFCOG's *Growth Trends to 2045*, the City is estimated to have a population of 93,100 in 36,700 households in 2045. Per the analysis, the City can provide the units necessary to assist our region with housing units just through the existing pipeline and potential entitlements within the Tier I and II growth areas, not including increased density or other incentives that may encourage infill or redevelopment opportunities.

As a basis of this Plan, the projected levels of growth are considered to drive housing demand. It is important that City policy remains flexible to the housing market with regards to unit types, densities and unforeseen employment and economic development initiatives that may increase the need to provide more units than projected. Based on the assumptions of this plan at the time of adoption, the City has the existing housing stock and planned units to supply the population growth projected until 2045.

BURDENS ON SENSITIVE LANDS IN AND ADJACENT TO THE CITY OF FREDERICK



The City of Frederick has a considerable diversity of habitats within a relatively small area. Within a short distance, in nearly every direction from the City's center, there are forested lands, streams or a scenic river, open farmland with fence rows, and wooded parcels. The City of Frederick maintains a 7,500-acre Municipal Forest in the mountains to the northwest of the City, primarily to protect the City's mountain water sources. Beyond this forest, Frederick also serves as a gateway for many local and regional environmental resources in the Catoclin Mountain region.

One of the most important natural resources of the City of Frederick is the Monocacy River. The Monocacy River is one of the largest tributaries of the Potomac and its watershed drains about 970 square miles in Carroll, Montgomery, and Frederick counties in Maryland as well as parts of Pennsylvania. The Monocacy is also the principal water resource in the Frederick region. Most wetlands in the Frederick region are also located along the Monocacy and its tributaries.

One of the premises for the tiered level of growth is to continue the balance development with environmental stewardship. This includes the preservation of forest land, the management of air quality, and the protection of water quality.

Sensitive areas include streams and their buffers; 100-year floodplains, habitats of threatened and endangered species; and steep topographic slopes as well as other areas that the City determines are in need of protection. As the City continues to grow, the protection of its sensitive areas will be ever more critical. Given the Monocacy River watershed's importance to Frederick and the diversity of sensitive areas it contains, this habitat continues to receive special consideration.

The municipal annexation described in this and the Land Use Chapter will also have a major impact on how the City interacts with its natural surroundings. Development plans for annexation areas should take into consideration the effects that new development will have on the surrounding natural resources.

The City must decide on the appropriate balance between development and natural resource preservation and will continue to maintain policies that help its people and businesses achieve that balance. The Environmental Sustainability Chapter contains policies that provide more detailed information on conserving sensitive areas.

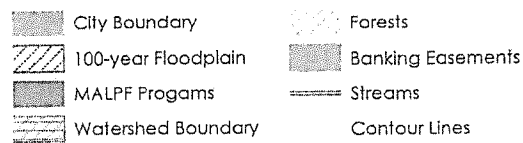
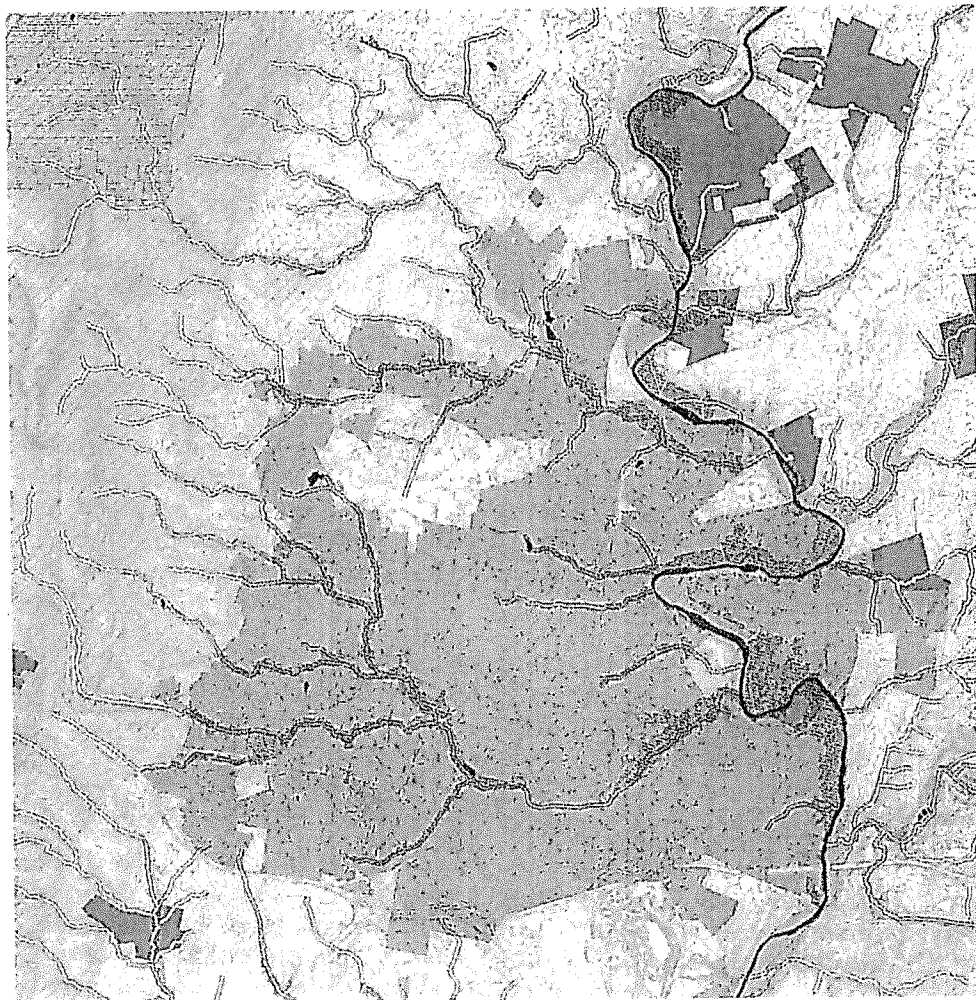


Figure 4-10: Sensitive Lands



AGRICULTURE EASEMENTS

The City must recognize that the open agricultural character of adjoining areas defines the City edges and offers contrast between the developed City and rural County. From that perspective, preservation of agricultural land and agriculture economy in the region is viewed as a means of framing the City's identity within the larger rural County. From a land use perspective, the City must develop in a way that transitions from a dense urban core to the rural agriculture land located in the County.

When considering development entitlements, the State and County offer agriculture easements to preserve and conserve the necessary agriculture land for our community. It also restricts development and forces land use decisions. These easements are an important consideration and a factor in shaping the potential growth pattern of the City. Where they may limit development and potential annexation, they may provide many other resources that allow concentrated development within the City boundary.

As shown in Figure 4-11, there are several parcels encumbered by agriculture easements that are in proximity to existing City boundary.

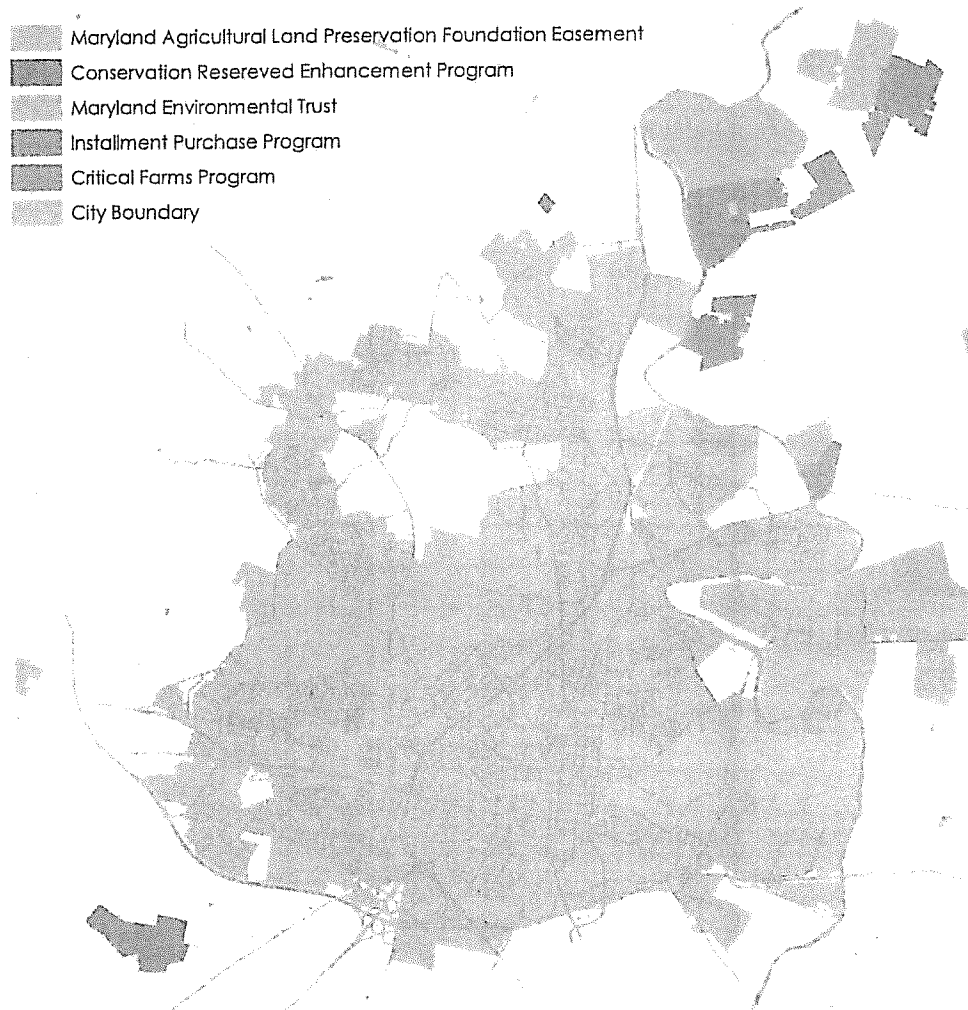


Figure 4-11: MALPF Programs



GROWTH'S IMPACTS ON PUBLIC SERVICES AND COMMUNITY FACILITIES

DEVELOPMENT IMPACTS

The anticipated growth will demand additional resources for public services and facilities provided by the City, County and others. Impacts include increased demand for water, sewer, roads, schools as well as other public facilities such as police, fire and rescue, parks and libraries. While the City is diligent to ensure that adequate capacity is available for the services that it controls, the City does not govern the capacity of schools, libraries, fire and rescue and select sewer services.

The following impact estimates are derived using multipliers that represent assumptions about the level of service that will be provided in the future. New dwelling units or new population are the "service units" representing demand. The multiplier table was derived using information from local leaders and national industry standards. Many factors are involved with the level of service provided for each community, the purpose is to provide a general analysis for long term projections.

Table 4-9: Impact Estimate on Facilities and Services

1. See Table 4-11 for a detailed pupil yield rate for Grade Level and dwelling type.

2. Ratio does not include administrative or support staff.

3. Varies by unit type.

4. See City Engineering Division FLOW CAPACITY MATRIX.

FACILITY / SERVICE	MULTIPLIER	SERVICE UNIT
City of Frederick		
City Staff (FTE)	0.91	100 Residents
Frederick County Public Schools		
Elementary School		
Students	0.19	Per Dwelling Unit ¹
Teachers	24.8	Student to Teacher Ratio ²
Middle School		
Students	0.1	Per Dwelling Unit ¹
Teachers	18.5	Student to Teacher Ratio ²
High School		
Students	0.13	Per Dwelling Unit ¹
Teachers	20.25	Student to Teacher Ratio ²
Police		
Sworn Officers	1 sworn officer	500 Residents
Fire and Rescue		
Personnel	1	500 Residents
Water and Sewer – Residential		
Water	250 GPD ³	Per Single Family Dwelling Unit
Sewer	251 GPD ³	Per Single Family Dwelling Unit
Water and Sewer – Commercial		
Water	Varies by Land Use ⁴	Gross Floor Area
Sewer	Varies by Land Use ⁴	Gross Floor Area
Libraries	1,000 ft ²	10,000 Residents
Parks and Recreation	10 acres	1,000 Residents

PUBLIC SCHOOLS

City residents are served by Frederick County Public Schools (FCPS) for Kindergarten through Grade 12 public education. Impacts to FCPS enrollment levels are directly affected by the anticipated growth and development described in this Plan. In order to ensure quality education for all students of Frederick County, FCPS reviews the City's development review plans for consistency with the FCPS Educational Facilities Master Plan (EFMP). A typical review consists of comments and consideration to the Adequate Public Facilities Ordinance including enrollment and capacity as well as other site design standards.

As depicted in Table 4-10, there are 26 schools that service City residents. Nearly half (12) are over the State Rated Building Capacity, with 3 determined to be 125% over the SRC. As of recently and most likely in the foreseeable future, the schools that are most effected by City development pressure are those service the north west quadrant of the City. These are demarked with an asterisk in Table 4-10.

When considering the impacts of potential development within the City to the school system, it should be noted that school enrollment and staffing are only assumed for City developments. These assumptions do not consider other developments outside of the City's jurisdiction and within the same school district, the possibility of redistricting or other influences that would impact the future development potential or entitlements to properties. When considering the potential for Tier I and Tier II buildout, beyond the current pipeline, there is potential for 5,600 additional housing units, not including future annexations. These housing units have the potential to add 1,064 elementary, 560 middle, and 728 High school students dispersed throughout the school district.

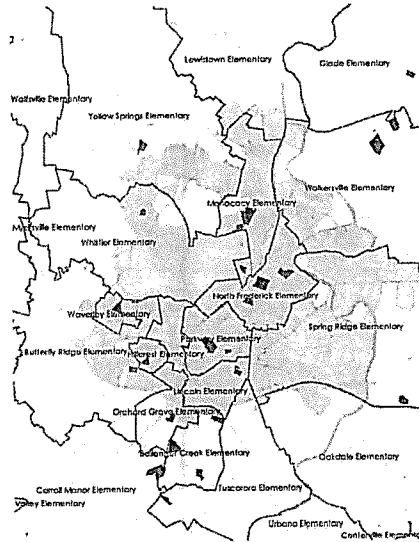


Figure 4-12: Elementary School Boundary

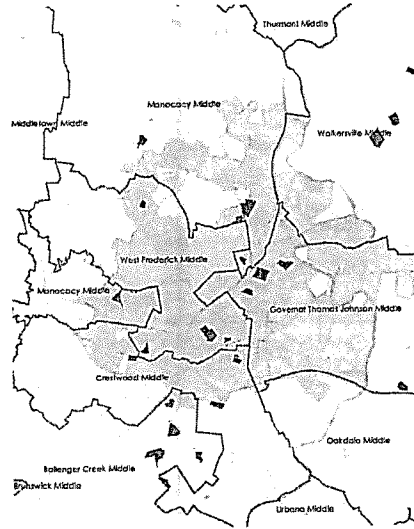


Figure 4-13: Middle School Boundary

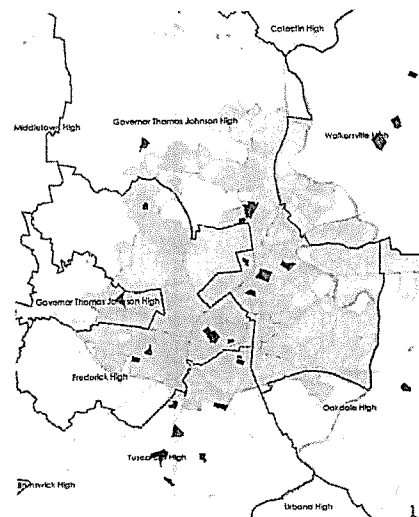


Figure 4-14: High School Boundary

Table 4-10: Enrollment
Capacity of Schools
that Serve the City

	Total Enrollment	Equated Enrollment*	State Rated Building Capacity	Percentage Capacity
Elementary Schools				
1 Ballenger Creek	589	571	614	93%
2 Butterfly Ridge	676	649	734	88%
3 Hillcrest	751	683	537	127%
4 Lewistown*	195	181	174	104%
5 Lincoln	599	571	656	87%
6 Monocacy*	613	591	574	103%
7 North Frederick	668	638	735	87%
8 Oakdale	793	793	624	127%
9 Orchard Grove	635	601	598	101%
10 Parkway	242	242	228	106%
11 Spring Ridge	484	449	523	86%
12 Walkersville*	678	661	683	97%
13 Waverley*	548	513	355	145%
14 Whittier*	718	675	626	108%
15 Yellow Springs*	471	471	421	112%
TOTAL	8660	8289	8082	103%
Middle Schools				
1 Ballenger Creek	818	818	859	95%
2 Crestwood	690	690	850	81%
3 Governor Thomas Johnson*	555	555	827	67%
4 Monocacy*	970	970	914	106%
5 Oakdale	872	872	775	113%
6 Walkersville*	879	879	1105	80%
7 West Frederick	952	952	1049	91%
TOTAL	5736	5736	6379	90%
High Schools				
1 Frederick	1508	1508	1601	94%
2 Governor Thomas Johnson*	1729	1729	2001	86%
3 Tuscarora	1586	1586	1749	91%
4 Walkersville*	1185	1185	1039	114%
TOTAL	6008	6008	6390	94%

* Equated Enrollments count Pre-K Students as 1/2 full time student.

A major theme of this plan is to guide future growth and development with flexibility for the next 10 to 20 years. As technology continues to advance at exponential rates it is probable that local school systems, including FCPS, will adjust to meet modern developments. This may include new ways of instruction that could change the way enrollment and capacity is calculated. The City will continue to provide quality housing to meet the needs of the projected population growth, while remaining flexible to the existing and future capacity of the local school system.

School Enrollment Forecast Equal Dwelling Type Mixture
33% Single Family, 33% Townhomes, 33% Multifamily

	2,020	2,025	2,030	2,035	2,040	2,045
School Enrollment Forecast Total Housing						
Units: All Dwellings						
Households*	30,900	34,100	35,200	35,900	36,600	36,700
Elementary School Students	5,871	6,479	6,688	6,821	6,954	6,973
Middle School Students	3,090	3,410	3,520	3,590	3,660	3,670
High School Students	4,017	4,433	4,576	4,667	4,758	4,771
Total Number of Students**	12,978	14,322	14,784	15,078	15,372	15,414
Households						
Single Family	10,197	11,253	11,616	11,847	12,078	12,111
Townhomes	10,197	11,253	11,616	11,847	12,078	12,111
Multifamily	10,197	11,253	11,616	11,847	12,078	12,111
Elementary School Students						
Single Family	1,937	2,138	2,207	2,251	2,295	2,301
Townhomes	2,447	2,701	2,788	2,843	2,899	2,907
Multifamily	1,224	1,350	1,394	1,422	1,449	1,453
Total Elementary School	5,608	6,189	6,389	6,516	6,643	6,661
Middle School Students						
Single Family	1,122	1,238	1,278	1,303	1,329	1,332
Townhomes	1,224	1,350	1,394	1,422	1,449	1,453
Multifamily	510	563	581	592	604	606
Total Middle School	2,855	3,151	3,252	3,317	3,382	3,391
High School Students						
Single Family	1,530	1,688	1,742	1,777	1,812	1,817
Townhomes	1,326	1,463	1,510	1,540	1,570	1,574
Multifamily	612	675	697	711	725	727
Total High School	3,467	3,826	3,949	4,028	4,107	4,118
Total Number of Students All Grades	11,930	13,166	13,591	13,861	14,131	14,170

School Enrollment Forecast Dwelling Type Mixture
Higher Density: 20% Single Family, 40% Townhomes, 40% Multifamily

Households	30,900	34,100	35,200	35,900	36,600	36,700
Single Family	6,180	6,820	7,040	7,180	7,320	7,340
Townhomes	12,360	13,640	14,080	14,360	14,640	14,680
Multifamily	12,360	13,640	14,080	14,360	14,640	14,680
Elementary School Students						
Single Family	1,174	1,296	1,338	1,364	1,391	1,395
Townhomes	2,966	3,274	3,379	3,446	3,514	3,523
Multifamily	1,483	1,637	1,690	1,723	1,757	1,762
Total Elementary School	5,624	6,206	6,406	6,534	6,661	6,679
Middle School Students						
Single Family	680	750	774	790	805	807
Townhomes	1,483	1,637	1,690	1,723	1,757	1,762
Multifamily	618	682	704	718	732	734
Total Middle School	2,781	3,069	3,168	3,231	3,294	3,303
High School Students						
Single Family	927	1,023	1,056	1,077	1,098	1,101
Townhomes	1,607	1,773	1,830	1,867	1,903	1,908
Multifamily	742	818	845	862	878	881
Total High School	3,275	3,615	3,731	3,805	3,880	3,890
Total Number of Students All Grades	11,680	12,890	13,306	13,570	13,835	13,873

School Enrollment Forecast Dwelling Type Mixture
Lower Density: 50% Single Family, 25% Townhomes, 25% Multifamily

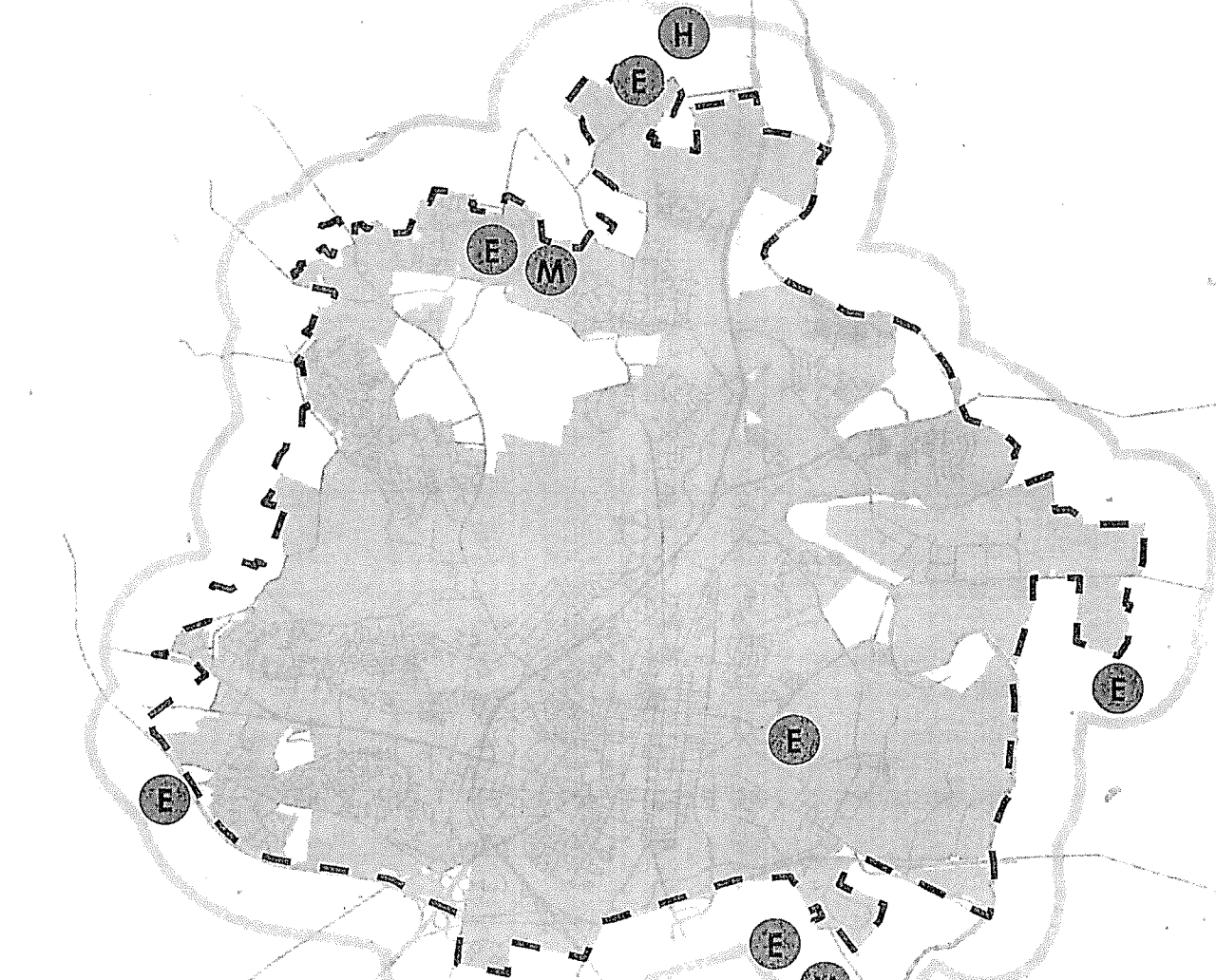
Households	30,900	34,100	35,200	35,900	36,600	36,700
Single Family	15,450	17,050	17,600	17,950	18,300	18,350
Townhomes	7,725	8,525	8,800	8,975	9,150	9,175
Multifamily	7,725	8,525	8,800	8,975	9,150	9,175
Elementary School Students						
Single Family	2,936	3,240	3,344	3,411	3,477	3,487
Townhomes	1,854	2,046	2,112	2,154	2,196	2,202
Multifamily	927	1,023	1,056	1,077	1,098	1,101
Total Elementary School	5,717	6,309	6,512	6,642	6,771	6,790
Middle School Students						
Single Family	1,700	1,876	1,936	1,975	2,013	2,019
Townhomes	927	1,023	1,056	1,077	1,098	1,101
Multifamily	386	426	440	449	458	459
Total Middle School	3,013	3,325	3,432	3,500	3,569	3,578
High School Students						
Single Family	2,318	2,558	2,640	2,693	2,745	2,753
Townhomes	1,004	1,108	1,144	1,167	1,190	1,193
Multifamily	464	512	528	539	549	551
Total High School	3,785	4,177	4,312	4,398	4,484	4,496
Total Number of Students All Grades	12,515	13,811	14,256	14,540	14,823	14,864




* Source: Metropolitan Washington Council of Governments.

** 0.19 E.S. students, 0.10 M.S. students, 0.13 H.S. students per household for all dwelling types.
0.19 E.S. students, 0.11 M.S. students, 0.15 H.S. students per household for Single Family Dwellings.
0.24 E.S. students, 0.12 M.S. students, 0.13 H.S. students per household for Townhouse Dwellings.
0.12 E.S. students, 0.05 M.S. students, 0.06 H.S. students per household for Multifamily Dwellings.

Table 4-11: School Enrollment Forecast Total Housing Units

Future School Sites

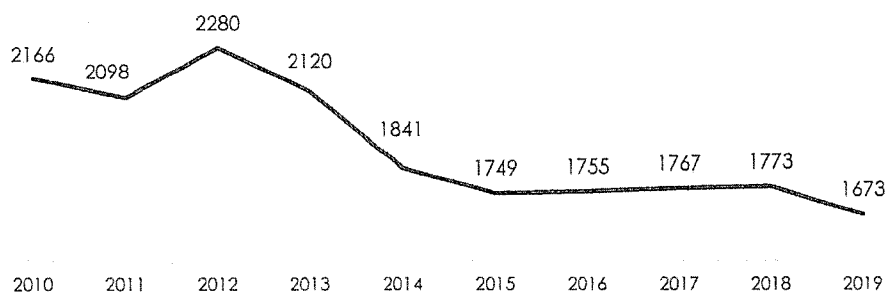


-  First Tier Growth Area (City Boundary)
-  Second Tier Growth Area (Utility Service Area) (PRWSA)
-  Third Tier Growth Area
-  Future School Sites
 - E: Elementary School
 - M: Middle School
 - H: High School

PUBLIC SAFETY

The City of Frederick provides its own public safety services. Divided into three bureaus- Administrative, Operations, and Support Services- the Frederick Police Department provides law enforcement services 24 hours a day for the 72,152 residents of Frederick's approximately 24 square miles. As shown in Figure 4-15, the City generally has a low and decreasing level of crime, contributing to the City's high quality of life.

Figure 4-15: City of Frederick's Total Crimes
Source: Frederick Police Department



The addition of approximately 10,200 and 13,700 residents in the City over the next 10 and 25 years, respectively, will place additional service demands on public safety resources. As shown in Table 4-12, using International City/County Management Association (ICMA) data, the City will expect to employ approximately 179 sworn officers in 2030 and 186 in 2045. It should be noted that this figure is provided to show an estimate and there are many factors beyond the City's population that determine the number of sworn officers needed to effectively serve the City.

Currently, due to space constraints, the police headquarters is not located in a centralized location. It has been concluded that the current configuration of the Police Department is inadequate for current and future needs. A recommendation of this plan is to prioritize the acquisition and planning for a new police headquarters in the downtown area.

Table 4-12: Sworn Officers Projection
Source: Frederick Police Department

	2025	2030	2035	2040	2045
Frederick's Population	87,000	89,600	91,100	92,800	93,100
Sworn Officer	174	179	182	186	186

FIRE AND EMERGENCY SERVICES

Frederick County provides fire protection services for all County and City residents. Additionally, the County provides disaster protection, emergency health care, rescue, and other related services for the City. Since Fire and Emergency Services are provided to an area larger than the City itself, service levels are impacted not only by growth and development in the City, but also by development throughout the County. Policies in this Plan do not entail significant expansion of the City fire protection service areas. However, the

Plan does call for intensified monitoring of response times and equipment capabilities and ensuring that response times and service levels remain adequate or improve over time.

The Frederick County Division of Fire and Rescue Services (DFRS) views the City and its potential growth as the population center of the County and the area where most of the fire and EMS incidents occur. Stations 1, 2, 3, 4 and 31, as well as the DFRS Headquarters, are located within the City and its growth areas.

Current DFRS locations include four downtown stations, three of which are located within the County's area of highest demand. All are primarily career operated and are in close proximity. Stations 1 and 3 are fire stations with engines, ambulances and other equipment; Station 4 houses only a truck company, while Station 2 and the DFRS Headquarters house Advanced Life Support (ALS) units. The Frederick County Fire Rescue Service Plan indicates that this arrangement has excessive redundancy and is not efficient use of resources. The City of Frederick could be more efficiently served by a consolidated downtown station and stations strategically located around the outer portions of the city; this configuration could help to maximize 4-minute travel time coverage as the City grows both in population and area.

According to the Rescue Service Plan, there are three future fire-rescue station locations planned to improve City service. It is important to note that these recommendations are from the DFRS Rescue Service Plan and are not a recommendation from the City.

North Frederick – Site Acquired

As development has continued throughout the Route 15 corridor North of Opossumtown Pike in the City of Frederick, service demand in this area has continued to increase. This is an urban mixed-use development area that consists of single-family homes, multi-family apartments/condominiums mixed use retail commercial/professional office facilities, medical offices/institutions, educational institutions, light industrial facilities and assisted living facilities. The Junior Fire Company station located at 535 North Market Street, in downtown Frederick is currently the primary service provider to this growth area.

Given the current service demand in this growing corridor, the Division of Fire and Rescue Services views this area to be our number one priority to locate a new fire-rescue station. This station would be developed in partnership with the Junior Fire Company. The intent is for the County to build the station and Junior Fire Company would provide the fleet vehicles for the station and the facility would be staffed with a combination of career and volunteer personnel.

Downtown Frederick – (No Site Identified)

Currently, the core downtown area of the City is serviced by three (3) separate Fire-Rescue stations which are all located within 0.6 miles of each other. The United Steam Fire Engine Company located at 79 South Market Street, the Citizens Truck Company located at 15 South Court Street and the Junior Fire Company located at 535 North Market Street. This condensed situation exists today primarily because the stations were constructed during the era of non-motorized fire apparatus.

The current United Steam Fire Engine Company station no longer adequately serves the needs of the career and volunteer personnel. The apparatus bays barely accommodate the fire and rescue vehicles that operate from this station. The station is landlocked with no option to increase space through expansion of the station and the historic significance of the building makes renovation problematic.

While the current Citizens Truck Company station is in good structural condition, it is also crowded for the response vehicles and personnel that operate from this station. This facility is redundant, and in practice does not make good economic sense to fund a facility that houses a single fire suppression response function.

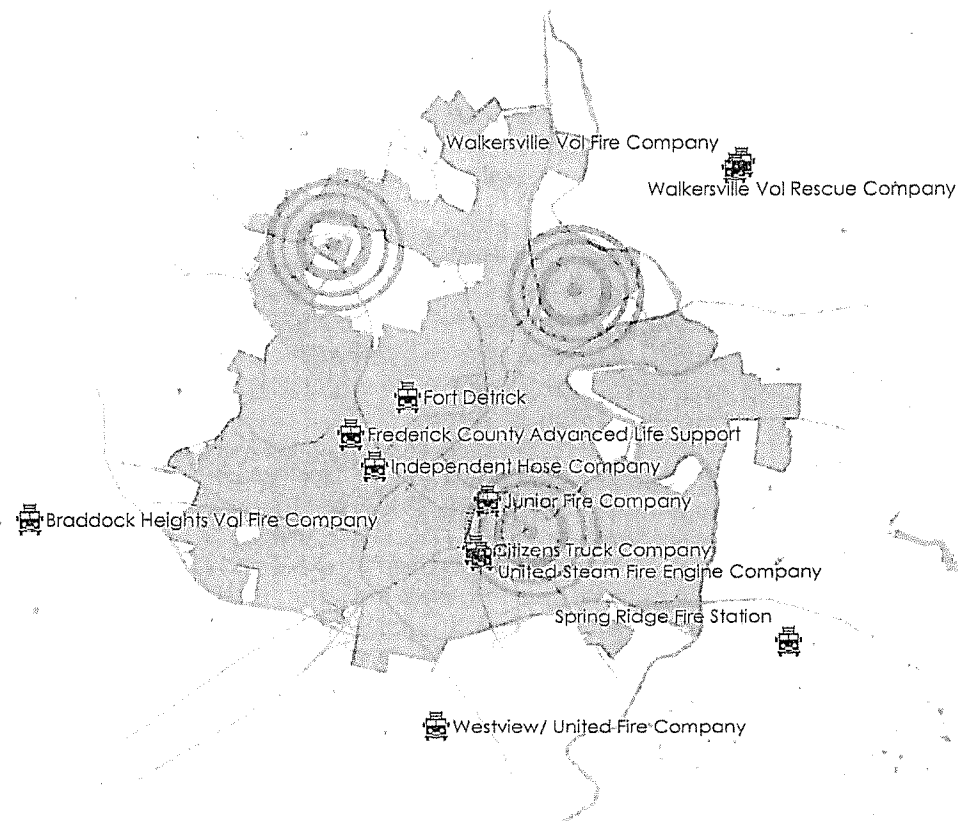
The optimal solution is to locate a downtown fire station site and construct a new station that would combine the functions of the United Steam Fire Engine Company and the Citizens Truck Company into a single downtown fire-rescue station.

Due to limitations in the availability and eligibility of land in the core downtown area, it is doubtful that a 40-acre site could feasibly be obtained. As a result, the site that is selected will likely dictate the need for a multistore rescue station be constructed to house the downtown companies

Walter Maritz Road / Christopher Crossing – (Site Acquired)

Given the current growth in the Yellow Springs/Christopher Crossing/Whitter areas in west Frederick City and the continuing requests for land annexation into the City, a parcel of land has been acquired from The City of Frederick as a placeholder for a future fire-rescue station site to serve the greater Yellow Springs area.

Figure 4-16: Existing Fire Stations and Proposed Areas for future Stations



This area continues to see land use applications for low and medium density residential development in single family attached and detached arrangement. Smaller general commercial development which typically serve for residential support will also occur in this growth area.

With growth in the City of Frederick and environs continuing to progress to the North and West, an additional fire – rescue station will be needed to meet the service demand that this growth will generate.

WATER AND SEWER FACILITIES

A detailed description of the City's existing and planned public water and sanitary sewer services and facilities is provided in the Water Resources Chapter. This section only summarizes the impact of future growth on those facilities. Currently the City has 5.39 million GPD of water available to units that have been accounted for in the development pipeline or anticipated in the PRWSA. Future available capacity for units that have not received entitlements or accounted for in the PRWSA equals 1.47 million GPD. If the available water was allocated only to future residential development, there is capacity for 6,774 residential units (1.47M / 217) is the average of 250 GPD/SF, 225 GPD/TH, 175 GPD MF) or the additional population of 16,935 residents or approximately a total City population of 120,000.

Note that this calculation does not include future commercial development that may be proposed in Tier I or Tier II. If the total buildout of 7.9 million square feet of non-residential development forecasted in Table 4-6 would be realized in vacant land only, approximately 5-10 million GPD of water would be demanded. This does not include areas located within Tier II or future annexations.

It is difficult to assess the exact water demands for future development, especially non-residential. These numbers were estimated only to provide a general assumption for future growth capacity for only residential and non-residential development and not a mixture of uses. Further engineering studies will be conducted to analyze the exact implications of the infill development, development not accounted for in Tier II or the PRWSA, and the impacts of future annexations on the available capacity.

TRANSPORTATION INFRASTRUCTURE

While there is an impact on roads and other transportation infrastructure from new development, there is not a simple service unit to be provided and so there is not a simple multiplier. Trips generated by a given development are spaced throughout the day. Some trips may be at rush hour; others may occur mostly at off-peak hours; still others may be irregular. Further, each development can undertake efforts to shift trips from modes whose infrastructure is heavily used (such as driving) to modes whose infrastructure is not (such as walking or biking) and so alter the particular impacts on the City's transportation infrastructure. As a result, the City's approach to assessing transportation impacts is done on a case-by-case basis to ensure the city's transportation infrastructure can accommodate the new development.

LIBRARY SYSTEM

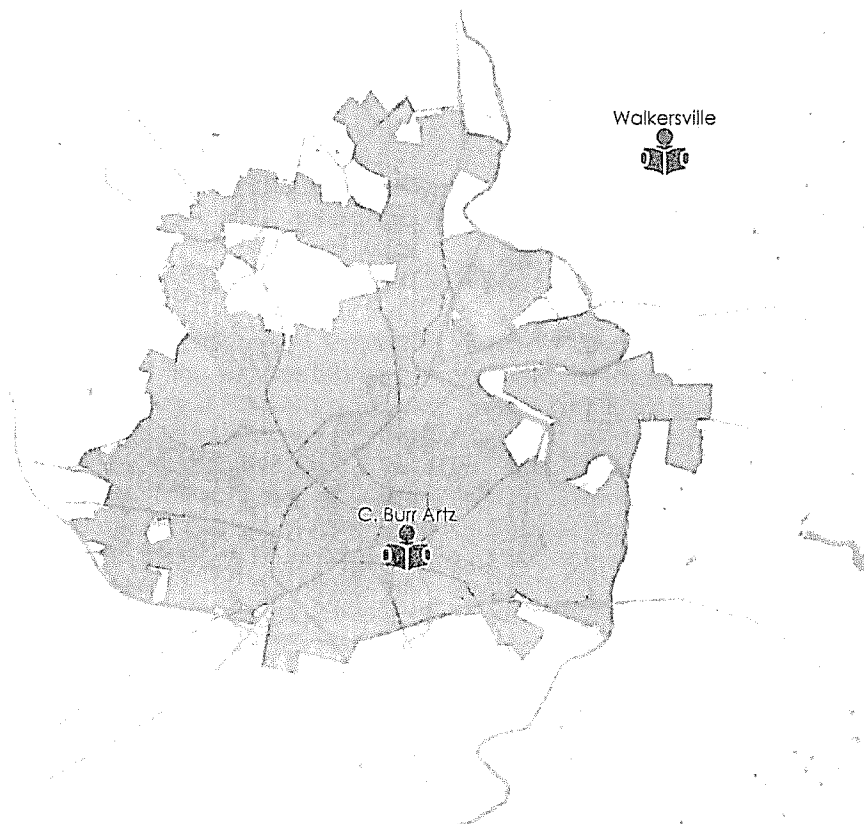
The Frederick County Public Library System is a county-wide system consisting of 9 branches serving more than 250,000 County residents. One library branch serves the City of Frederick: the 66,000 square foot C. Burr Artz Library located on 110 East Patrick Street and situated on the Carroll Creek. The C. Burr Artz Library also serves as the County's central library system. Per the American Library Association's suggested standards of 1,000 square feet of library space per 10,000 residents the City's library is more than adequate in size to accommodate our expected population growth through 2030.

Nevertheless, with the anticipated growth, the library service requirements will increase. Future library needs will consider growth in the north and possibly west areas of the City. The Frederick County Public Library's twenty-year plan also recommends that by 2030 an additional library will be located within the north area of the City and recommends that the C. Burr Artz Library is renovated as well.

RECREATION

A detailed description of the City's existing and planned public parks and recreation services and facilities is provided in the Parks and Recreation Chapter. The City has 75 public parks, totaling 807 acres, with an average size of 10.7 acres equating to approximately 11 acres of parkland per 1,000 residents, thereby exceeding the National Recreation and Parks Association guidelines of 10 acres per 1,000 residents. The projected population in the year 2045 is 93,100 residents requiring at least 931 acres of parkland to comfortably serve the community. As the City prepares for future growth, approximately 124 additional acres of parkland will be needed in the next 25 years.

Figure 4-17: Existing Libraries



MUNICIPAL GROWTH POLICIES

FOR MORE INFORMATION ON THE POLICIES, IMPLEMENTATIONS, PRIORITIES, AND RESPONSIBLE PARTIES, PLEASE SEE "IMPLEMENTATION CHAPTER".



MG POLICY 1

The City of Frederick will manage development of vacant and redevelopment of underutilized lands by promoting greater densities and a mixture of residential and non-residential uses.

MG POLICY 2

Manage annexations in a manner to provide the necessary dwelling units and nonresidential structures to supply the demand of the future population and employment projection.

MG POLICY 3

The City will continue to work to ensure that adequate police will be available throughout existing and future growth areas.

MG POLICY 4

The City will continue to protect and conserve the existing water supply systems for existing residents and future development.

MG POLICY 5

The City will provide for wastewater capacity that serves existing neighborhoods and future growth.

MG POLICY 6

The City will continue to collaborate and coordinate with the State of Maryland and Frederick County about future development projects to ensure adequate public facilities and services are provided for the growing population and projected growth.

MG POLICY 7

Actively engage underrepresented communities and low-income residents into decision-making processes regarding public services and amenities as the City's population continues to grow.

MG POLICY 8

Establish and maintain a monitoring system to measure progress toward achieving the policies of the Municipal Growth Chapter.

